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The reason most plumbers and steamfitters when submitting estimates figure on installing cheap goods is because they know the other bidders will do so, and their bids must be somewhere near the bids of others. Why not submit two bids? One specifying the rottenest goods the market affords, and telling the truth about their flimsy, defective character, the other based upon using only advertised branded goods, behind whose satisfactory operation you, the wholesaler and the maker stand with guarantees? Which hand wins?

The Need of Standards

Progress in the world's history in science, art and industry, has always been preceded by **the conception of an idea.** Some person, with a mind alert and active, has conceived an improved condition in some particular form of activity. **This idea has been translated into an externalized form** so that if it lies in the realm of science people are able to comprehend it by a **written statement:** if it lies in the realm of art, it has been exposed to the public comprehension by means of a **canvas, a poem or an essay.** If it lies in the realm of industry it finds expression in the form of an **improved method of manufacture, or an improved product.** In any case **the idea has been the standard** by which the conception has been worked out. **Therefore, it is absolutely necessary to have a standard in the mind first** and to that standard we approach in the resultant material manifestation of mental activity. In the plumbing and steam and hot water heating lines there has been **considerable advance made in raising the standard of productions.** For example, in the heating line we have now a **standard for flanges.** Through this same operation of mental activity we are also permitted to enjoy a **standardization of threads.** What this means to the world can be remembered by the older mechanics who were accustomed to many diverse threads. In the plumbing line we are about to have established for us standards which will affect the **lead trap product, range boilers, and soil pipe.** The trade will welcome these standards and they will be found to be **the ideal toward which all manufacturers will progress. What we are entitled to as individual, yet component parts of the entire nation, we have a right to demand from our government.** Its operations touch every one of us in some portion of their application. In order that one may see how necessary it is that standards should be created, it is desirable to refer to the operations of the government in so far as it collects and publishes its statistics. A committee has been appointed of which O. P. Austin, of the Bureau of Statistics, Department of Commerce and Labor, is a member. This committee invites suggestions, and among the suggestions that can very well be made to the committee is that they **use the net ton** in their statistical work, or at least that they make the ton denomination **uniform in all its work.** The government has no uniformity in its practice and in some departmental statistics one finds the net ton adopted and in the other department the gross ton is selected. In the import and export department there is uniformity only. Here the gross ton of 2240 pounds is used in its statistics. But practice changes even in departments. For example in the early census statistics the gross

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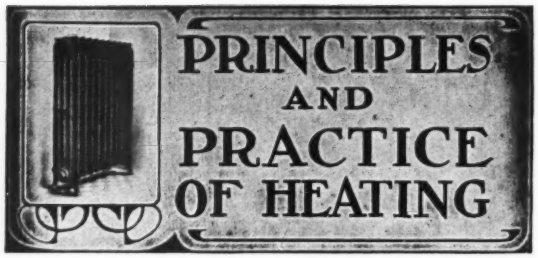

Progressive Heating—IX*

EDITED BY JNO. K. ALLEN

Associate Member American Society of Heating and Ventilating Engineers, Member American Society of Inspectors of Plumbing and Sanitary Engineers, Member Royal Sanitary Institute of Great Britain.

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Table No. 4 is intended to show the heat emission per square foot per hour for radiators of varying emissive power. The emissive power of the radiation is shown in the left hand column, and is called the co-efficient.

The co-efficient multiplied by the temperature difference, which is the line at the top of the table, gives the emission in heat units per square foot per hour, and immediately under is shown the condensation in pounds of steam per square foot per hour.

This gives the heating capacities of radiators of varying power

It is customary for the heating trade to assume that one square foot of average radiation will condense 0.3 pounds of steam per hour. Table No. 4 shows that this rate of condensation calls for a radiator with a co-efficient of 2.0 and a temperature difference of about 145°. It also shows that when a radiator has a co-efficient of 1.6, and the temperature difference is 150, the condensation is 0.25 pounds per square foot per hour.

In actual practice the condensation from a low pressure heating plant in cold winter weather will not average more than 0.22 pounds per square foot per hour. This is so for the reason that a portion of the radiation is not in full service, because of the presence of air in some of the loops, and this, of course, is due in great measure to faulty construction, and is especially true of any of the so-called one-pipe steam heating systems.

The figures of emission and condensation in Table No. 4 are based on Newton's law of cooling, which assumes that the quantity of heat given off in a given time is proportional to the temperature difference between the radiant body and the surrounding air. This is true for small temperature differences, but when the temperature difference is 50°,

TABLE NO. 4.

SHOWING HEAT EMISSION OF RADIATION IN B.T.U. AND CONDENSATION IN POUNDS PER SQ. FT. PER HOUR.

	—Temperature difference between radiator and— adjacent air (degrees).†						
(*)	50	60	70	80	90	100	110°
2.5	125 .130	150 .156	175 .182	200 .208	225 .234	250 .260	275 .286
2.4	120 .125	144 .150	168 .175	192 .200	216 .225	240 .250	264 .275
2.3	115 .120	138 .144	161 .168	184 .192	207 .216	230 .240	253 .264
2.2	110 .1145	132 .1375	154 .1605	176 .1835	198 .2065	220 .229	242 .252
2.1	105 .1095	126 .1315	147 .153	168 .175	189 .197	210 .219	231 .241
2.0	100 .1042	120 .125	140 .146	160 .167	180 .188	200 .2085	220 .2295
1.9	95 .099	114 .119	133 .1385	152 .1585	171 .178	190 .198	209 .218
1.8	90 .094	108 .1125	126 .1315	144 .150	162 .169	180 .188	198 .207
1.7	85 .088	102 .104	119 .124	136 .142	153 .1595	170 .177	187 .195
1.6	80 .0834	96 .100	112 .1166	128 .1335	144 .150	160 .167	176 .1845
1.5	75 .0782	90 .094	105 .1095	120 .125	135 .141	150 .156	165 .172
1.4	70 .073	84 .0876	98 .102	112 .1165	126 .131	140 .146	154 .1605
1.3	65 .0678	78 .0814	91 .095	104 .108	117 .122	130 .1355	143 .149
1.2	60 .0626	72 .075	84 .0875	96 .100	108 .1125	120 .125	132 .1375
1.1	55 .0574	66 .0688	77 .0801	88 .0916	99 .103	110 .1145	121 .126
1.0	50 .0522	60 .0625	70 .073	80 .0834	90 .094	100 .104	110 .1145
0.9	45 .047	54 .0563	63 .0656	72 .075	81 .0835	90 .094	99 .103
0.8	40 .0417	48 .05	56 .0583	64 .0666	72 .075	80 .0834	88 .0916
0.7	35 .0365	42 .0438	49 .051	56 .0583	63 .0656	70 .073	77 .0801
0.6	30 .0313	36 .0375	42 .0438	48 .05	54 .0562	60 .0626	66 .0688
0.5	25 .0261	30 .0313	35 .0365	40 .0417	45 .047	50 .0522	55 .0574

*Co-efficient or heat emitted per square foot per hour for one degree difference between radiator and surrounding air.

†First line of figures under each co-efficient indicates B.t.u. Second line indicates pounds.

*Previous installments of this series of articles were published in the issues of April 11 and 25, May 9, June 27, August 15, October 10, November 7 and 28. These numbers can be obtained for 10 cents a copy.

(*)	—Temperature difference between radiator and adjacent air (degrees).† 120	130	140	150	160	170	180
2.5	300 .312	325 .338	350 .364	375 .390	400 .416	425 .442	450 .468
2.4	288 .300	312 .325	336 .350	360 .375	384 .400	408 .425	432 .450
2.3	276 .288	299 .312	322 .336	345 .360	368 .384	392 .408	414 .432
2.2	264 .275	286 .298	308 .321	330 .344	352 .367	374 .391	396 .413
2.1	252 .263	273 .285	294 .307	315 .3285	336 .350	357 .372	378 .394
2.0	240 .250	260 .271	280 .292	300 .312	320 .334	340 .355	360 .375
1.9	228 .2376	274 .2575	266 .277	285 .297	304 .317	323 .337	342 .357
1.8	216 .225	234 .244	252 .263	270 .282	288 .301	306 .319	324 .338
1.7	204 .213	221 .230	238 .248	255 .266	272 .2835	289 .301	306 .319
1.6	192 .200	208 .217	224 .233	240 .250	256 .267	272 .2835	288 .300
1.5	180 .1875	195 .203	210 .219	225 .235	240 .250	255 .266	270 .2815
1.4	168 .175	182 .1895	196 .204	210 .219	224 .233	238 .248	252 .2625
1.3	156 .1625	169 .176	182 .1895	195 .203	208 .2165	221 .230	234 .244
1.2	144 .150	156 .1625	168 .175	180 .1875	192 .200	204 .215	216 .225
1.1	132 .1375	143 .149	154 .1605	165 .172	176 .1835	187 .195	198 .206
1.0	120 .125	130 .1353	140 .146	150 .156	160 .1665	170 .177	180 .1875
0.9	108 .1125	117 .122	126 .131	135 .1405	144 .150	153 .1595	162 .169
0.8	96 .100	104 .1083	112 .1165	120 .125	128 .133	136 .1415	144 .150
0.7	84 .0876	91 .095	98 .102	105 .1093	112 .1165	119 .1240	126 .1310
0.6	72 .075	78 .0814	84 .087	90 .094	96 .10	102 .106	108 .1125
0.5	60 .0625	65 .0677	70 .073	75 .0782	80 .0834	85 .0886	90 .094

the transmission of heat will be about 25% less than shown in the table, and when the temperature difference is 180, it will be about 8% greater. For 200° temperature difference it will be 13% greater, and for 300° temperature difference it will be about 46% greater than the quantities computed from Newton's law.

TABLE NO. 5.

Temperature difference, F. deg.	Multipliers.	Temperature difference, F. deg.	Multipliers.
50	.75	130	.98
60	.77	140	1.00
70	.80	150	1.00
80	.83	160	1.02
90	.86	170	1.05
100	.89	180	1.08
110	.92	200	1.13
120	.95	300	1.46

Table No. 5 gives the multipliers which may be used for the various temperature differences to correct the figures given in Table No. 4.

For example: In table No. 4 under a temperature difference of 80°, and opposite the co-efficient of 2.0, the emission per square foot per hour is 160. The multiplier for correction is .83; multiplying 160 by .83 corrects the quantity to 133.

Under 180°, and opposite the co-efficient of 1.6, find 288. Multiply this quantity by 1.08, which increases the emission to 311.

Under a temperature difference of 150, and opposite the co-efficient of 1.6, find 240, which is the quantity of heat emitted in B. t. u. per square foot per hour by one square foot of steam heated radiation.

Under a temperature difference of 100, and opposite the co-efficient of 1.6, the heat emission is 160. The temperature difference of 100 conforms to the usual practice in hot water heating, where the mean temperature of the radiation is 170° and the surrounding air at 70°. The multiplier for correction for 100° is .89, which reduces the heat emission from 160 to 142.5.

Those figures may not be absolutely correct, but they are based on the findings of the highest authorities. The exact truth, however, in regard to the proportion of heat emission for various temperature differences will never be known until exhaustive tests have been made with a wide range of conditions.

(To be continued. All rights of republication reserved.)

"The Guard of Honor." David Craig, of Boston, former president of the National Association of Master Plumbers; and Jacob Isaacs, of Louisville, Ky., president of the Kentucky State Associaton of Master Plumbers. Photograph by our Mr. Winslow.

Heating by Forced Hot Water Circulation

CHAS. L. HUBBARD

This system of heating is now so extensively used in large buildings in connection with power and lighting plants it seems that something upon the subject might be of interest to designing engineers in charge of such plants.

Heaters. — Two classes of heaters are commonly used in this work, one in which the water is heated by surfaces in direct contact with the fire and gases of combustion, and the other where steam is the medium for conveying the heat to the water. In the first instance any good form of hot water boiler may be used, the same as for gravity heating.

When of the horizontal tubular type the entire shell may be filled with tubes, as no steam space is required, but in order to prevent the water from passing in a direct line from the inlet to the outlet a series of baffle plates should be used to bring it in contact with all parts of the heating surface.

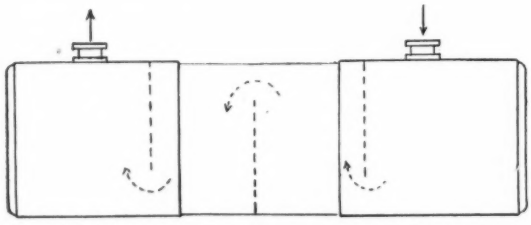

Fig. 1. Sketch showing arrangement of baffle plates in horizontal tubular boiler.

This arrangement is shown in diagram in Fig. 1. The brick setting for such a boiler should be provided with a return flue over the top of the shell in order to increase the heating surface. The method of computing the size of a boiler for forced circulation is the same as for gravity work.

Forced circulation is more commonly used in buildings which have their own power plant, as in these cases there is available a considerable quantity of exhaust steam. In buildings of this kind it is customary to use steam heaters instead of the boilers above described, and supplement the exhaust by live steam at a reduced pressure, when it is not sufficient in quantity. Sometimes a steam heater and a heating boiler are used in combination, first passing the return water through the steam heater and then through the boiler, but it is more common where steam is used at all to do all of the water heating by steam, as it simplifies the piping and other apparatus to a considerable extent. In plants of this kind the water is heated in a closed feed water heater, with the steam on the inside of the tubes and the water on the outside. Such a heater with the proper connections is shown in Fig. 2. Any good form of heater can be used for this purpose, provided the connections are

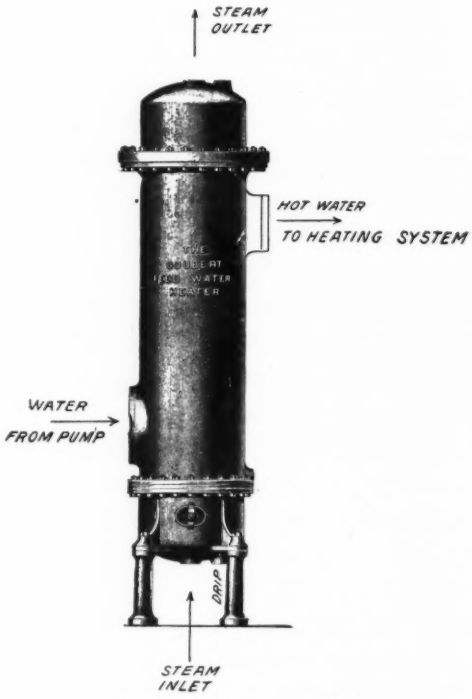

Fig. 2. Feed water heater.

made as in Fig. 2. It is necessary in this case to enlarge the nozzles commonly used for the feed water, as the standard sizes would be much too small for supplying steam to the heater. The tube surface in a heater of this kind has an efficiency of about 200 heat units per square foot per hour per degree difference in temperature between the steam and water. In systems of this kind the water is usually circulated at a higher temperature than in a gravity system, it being common in this case to start with an initial temperature of 200 degrees, dropping to about 160 in the return. This makes the average temperature of the water in the heater

180 degrees. If exhaust steam is used at atmospheric pressure the difference in temperature between the steam and water will be 212—180=32 degrees, giving an efficiency of 200×32=6,400 heat units per square foot of heating surface. If the efficiency of a direct radiator is taken as 170 and an indirect radiator as 400, then the required ratio between the *radiating* surface and *heating* surface will be 38 in the former case and 16 in the latter.

Example.—A building having 5,000 square feet of direct and 3,200 square feet of indirect radiating surface is to be warmed by hot water under forced circulation. Steam at atmospheric pressure is to be used for heating the water. How many square feet of heating surface should the heater contain? 5,000÷38=132 and 3,200÷16=200; therefore 132+200=332 square feet, the area of heating surface called for.

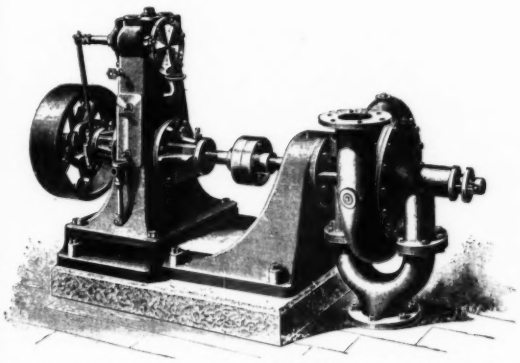

Fig. 3. Rotary pump driven by direct connected engine.

When the exhaust steam is not sufficient for all of the requirements the deficiency must be made up by the use of live steam. When the amount of live steam required is small it may be fed into the heater through a reducing valve and mixed with the exhaust. But if the amount is comparatively large it is better to condense it in a separate heater, as in this case the condensation, containing no oil, may be pumped back to the boilers, thus saving a considerable quantity of hot water which would otherwise be wasted. In the Evans-Almiral system of hot water heating the exhaust and live steam heaters are placed in series, the water from the pumps being first passed through the exhaust and then through the live steam heater. In other systems the heaters are placed in parallel and the proper volume of water passed through each by means of throttle valves.

Pumps.—Centrifugal or rotary pumps are usually employed for this class of work in preference to those of the piston or plunger type. They are simple in construction, having no valves, produce a continuous flow of water and, for the low heads against which they operate in heating work, have a good efficiency. A pump of this type, driven by a direct connected engine, is shown in Fig. 3. The inlet to the pump is shown by the flange at the bottom and the outlet is at the top.

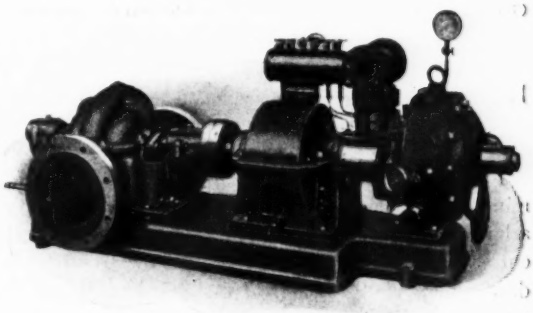

Fig. 4. Centrifugal pump of the De Laval type.

Under ordinary conditions the efficiency of a centrifugal pump falls off considerably for heads above 30 or 35 feet, but special high-speed pumps are constructed which work with a good efficiency against 500 feet or more. Such pumps are shown in Figs. 4 and 5, the former being driven by a steam turbine and the latter by an electric motor.

Under favorable conditions an efficiency of 60 to 70 per cent is often obtained, but for hot water

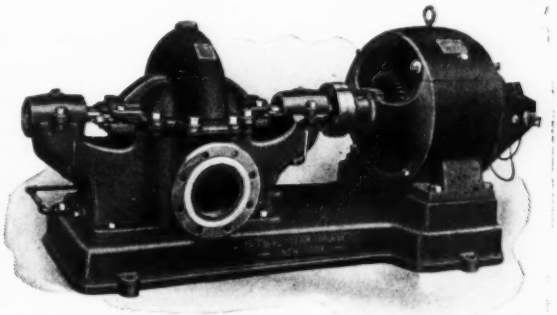

Fig. 5. Another centrifugal pump of the De Laval type.

circulation it is more common to assume an efficiency of about 50 per cent for the average case.

The theoretical horse-power required to move a given volume of water is found by multiplying the gallons pumped per minute by 8.3, and that result by the head in feet, and dividing the result by 33,000. To this must be added a certain amount,

depending upon the efficiency of the pump. This is expressed in a formula as follows:

$$H.P. = \frac{H \times V \times 8.3}{33{,}000 \times E}, \text{ in which}$$

H=friction head in feet.
V=gallons of water pumped per minute.
E=efficiency of pump.

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Better Light and Air for Miners

By A. Cressy Morrison

For several years acetylene has been used in miners' lamps in France, Germany and Belgium to a large and steadily increasing extent, until at present it is used almost exclusively in over two hundred mines and by approximately fifty thousand men. The light is satisfactory, saves nearly fifty per cent of the cost, giving more and better light. Mining engineers have been more or less familiar with this fact, but the introduction of acetylene into mines up to the last two years has been very slow in this country. Its use is now, however, coming to be recognized as an important advance, and it promises shortly to replace all other means of illumination, except in special cases.

It is seldom that an improvement in quality or advantage is accompanied by reduction in cost, but the paradox is a reality in the case of acetylene.

Candles, which are largely used throughout our western mines, remove seven times and kerosene five times as much oxygen as acetylene. The products of combustion given off by candles are ten times and from kerosene nine times as much as that given off by acetylene. The difference is, therefore, enormous. While acetylene in a mine gives off no smoke whatever, every miner is familiar with the difficulty from the products of combustion given off by other illuminants. Acetylene, therefore, makes for the life and comfort of the miners, protects them from the degenerating effects of insufficient oxygen and removes the one important cause of lung and throat troubles. The actual amount of illumination given by candles and kerosene is lessened by a very large percentage by the smoke and mist which so rapidly accumulate, whereas all the light given by acetylene reaches the point to be illuminated, without any interference whatever.

Better light and air for underground workers

It has been found, in actual experience, that in entries which are sixty or seventy feet ahead of the air there is not the slightest particle of smoke from an acetylene lamp and the entry is just as clear at the end of a shift as it is at the beginning.

An interesting thing about acetylene is the tenacity of the flame. It is not easily blown out, the rapid motion of the miner will not cause it to flicker badly, and it burns brilliantly in an atmosphere so foul that candles fade and go out. In fact, acetylene will not deprive the miner of light until the atmosphere is so bad it will not support life.

For underground surveying and mine inspection the use of acetylene is of great importance. Maps and records escape the usual accompaniment of grease and smudge. The acetylene flame is so small and clear that it affords an accurate point on which to sight instruments.

Another use for acetylene in somewhat larger units is found where the rays are concentrated by a reflector, in which case a brilliant illumination can be thrown into inaccessible places where distant bays, high backs, caved places and other difficult and otherwise hidden parts of the mine can be explored with convenience, and, in case of emergency, without danger.

Acetylene is especially advantageous as a cap lamp for drivers, and it has been found, where mules are used, that they can see much better and are not nearly so liable to stumble.

The very bad quality of oil for miners' use, which has in some states called for laws establishing a standard quality—laws, by the way, which are frequently violated by a species of adulteration which almost defies detection—is becoming another powerful argument in favor of the substitution of some illuminant which cannot be adulterated.

In this connection it is interesting to realize that acetylene is made in the miner's lamp as used, the principle being the bringing of water into contact with the carbide as the gas is burned, and in just sufficient quantity. The difficulties of this problem have been effectively overcome. As soon as the pressure of gas reaches the proper point for burning it holds the water in check until the consumption at the burner has so reduced the pressure that the water comes in contact with the carbide again.

In actual practice it has been found that four ounces of calcium carbide at four cents per pound

will give nearly ten candle power clear illumination without smoke for five hours. One-half pound, or two cents' worth, will give the same illumination for ten hours. Candles in many parts of the country, counting four candles to the ten-hour day, would cost five cents per day. There seems, therefore, to be no reason why acetylene should not be introduced, provided a proper lamp at an economical price can be devised. As a matter of fact, practical experience has demonstrated that some of the miners' lamps now upon the market meet all the necessary requirements both as to economy, lasting quality and practicability in use.

Acetylene miners' lamps are now frequently found in mines throughout the country, Pennsylvania, New Jersey and Illinois leading, though many other states are using the new light. The greatest number used by any one concern in its mines is probably by the New Jersey Zinc Company, of New York, which has adopted acetylene illumination for all its mines. The number of miners' lamps in use in the mines of this company is about 3,000, and it has been found, in practical use, that the saving is at least two cents per day for every miner.

The whole method of using acetylene is so simple and the lamps now in practical use are so satisfactory that the subject of better illumination in mines is worthy of attention of every mine owner and engineer. It is equally worthy of the attention of every mining organization, as well as every individual miner, because a change to better illumination at half the cost, with greater output, safety, comfort and, above all, good health, are matters of such vital importance that no careful manager will fail to investigate the subject.

The Position Occupied by the Society of Inspectors of Plumbing and Sanitary Engineers

The American Society of Inspectors of Plumbing and Sanitary Engineers is the youngest, perhaps, of any of the associations organized to consider the technical and mechanical sides of their callings. But, infant as it is, the society has before it the opportunity to do good and the ability to be of value to a degree which is seldom accorded to a society of men. In their role as sanitarians, the members are brought into daily contact with problems which bear more or less heavily on the welfare of the public health, and from their observation and experience are able to deduce truths which should be published for the benefit of the craft. The annual meeting of the society affords the opportunity to present the result of their investigations before a representative body of men, competent to consider fully and pass authoritative judgment upon the merits of each problem.

The value of the society lies in the fact that to it, as the fountain of knowledge, must all questions be referred for final settlement. It may be considered as a court of final jurisdiction and should prove itself ready and worthy of the trust. In this respect the society is unique. No other American society has secured footing upon so high a plane, and the reason is not far to seek. Take, for instance, the American Society of Heating and Ventilating Engineers. This society is composed of men actually engaged either as designing or installing engineers for heating and ventilating apparatus; during the interim between meetings many problems arise in the daily lives of the various members; and when a particularly valuable fact is discovered, or when a member believes he has discovered an improved or better way of doing work than obtained before, he communicates to the society, in a paper, the result of his observation and experiments, that the members may be in possession of the data, should occasion for its use arise in their practice. The engineers at the meeting are not hampered by rules and laws, so that upon returning to their business each can adopt any of the suggestions presented at the meeting which he may deem fit. For this reason no formal action is taken by the society as a whole, which after discussing each paper leaves it for the members to

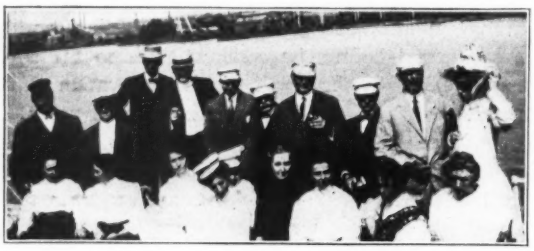
The importance of the personal attendance of every plumbing inspector in the country at the annual meetings of the American Society of Inspectors of Plumbing and Sanitary Engineers is emphasized in this article. The fourth annual meeting of this society will be held at Omaha, Neb., in the early part of February, 1909. It is the duty of every plumbing inspector to place this matter before his city government and secure its endorsement of his attendance at this meeting, together with the expenses connected therewith, and the present time is none too early to make these provisions.—Ed.

work out in practice according to their individual lights. In the plumbing business, however, things are different, and with such a method of procedure no headway can be made. The practice of plumbing, at the present time, is in a chaotic condition, and no matter how conscious of this fact some of the members of the craft may be, they are powerless to effect a change. Rules and regulations circumscribe them round, and they must conform to the requirements of the powers that be, even though they know the methods to be wrong. In the revising of codes, old practices are clung to tenaciously by the drafters who fear to break away from the ultra-conservatism of the majority, and while they might listen to the council of those who know, will not heed their advice. The Society of Plumbing Inspectors can change all this and at the same time place themselves in the position of arbiters of plumbing practice by considering carefully, thoroughly, fearlessly and honestly the various problems, requiring consideration, then solemnly passing upon each problem, thus giving it the weight of their official sanction.

To illustrate. At the present time there are very few intelligent men engaged in the plumbing business who are not convinced that 3-inch soil pipe is sufficiently large for an ordinary dwelling, or for a flat of not more than three bathrooms. Both plumbers and the public would be benefited by the change, yet the craft in the larger cities is powerless to follow the dictates of reason and experience because of the plumbing laws. Had the society at their last meeting, when the matter was presented to them in a very able paper, passed upon the subject, their united and official action would have settled the matter for the present time at least. Had their decision been in favor of 3-inch soil pipes under certain conditions, such a recommendation, it is safe to say, would be up for adoption before every building department having a plumbing code, for they could not well ignore the official recommendation of the society. If, on the other hand, their decision had been against the adoption of 3-inch pipe, for the present time, at least, or until such time as demonstration should have convinced the society of its error, not a plumbing department in the country would dare adopt the smaller pipe in the face of their adverse decision.

It will thus be seen what a mighty power the infant society can wield and how its opinions and decisions will be looked forward to by framers of plumbing codes; and this very responsibility places upon the society the obligation to do its duty to the fullest extent and without fear or favor. The necessity of the case will also excuse the deviation from precedents of deciding by official ballot the problems presented to it for consideration. By adopting the society vote and giving authority to its doings, the society will be a power of value in the world of plumbing; but without passing officially on the problems presented for consideration, the society degenerates to a little literary club, where men meet to read papers which so far as the good they accomplish is concerned might as well never have been written.

A word about the preparation of papers might not here be amiss. Occupying the position that they do, plumbing inspectors are in ideal circumstances for obtaining valuable information. The plumber who installs a job might never see it again, but the plumbing inspector, making his rounds, sees old work being overhauled or taken out, repairs made and new work put in. In the old work his records tell him its condition when passed by his department, and his own observation shows him how the system has withstood the ravages of time. If he is not interested in some particular phase of the work, however, he will note its condition in a general way only, but not with sufficient accuracy to base a paper on, and it is particular facts, not generalizations, which are of value in a paper. We all can generalize, but all have not equal opportunities to observe; and those who are deprived of the privilege must look through the eyes of the inspector. For this reason it is suggested that those who purpose presenting papers at the next meeting of the society decide upon a subject now, and during the succeeding months gather as many examples as they can to illustrate the case. By this method concrete facts can be cited to show the action of the material or system under consideration, and the papers can be submitted far enough in ad-



St. Louis delegates and their ladies on the Steamer "Indian" returning from the Boston convention of the National Association of Master Plumbers. Photograph by P. J. Cunningham of Philadelphia.

vance so that each member can have a copy before the convention, and thus be ready to contribute his observation and experience to the general discussion.

When "Stub" Made Good

By Edwin Drood

It was not Stub's fault that he was small. Had his wishes been consulted in the matter he would have had a tall, well-proportioned figure, instead of the five feet three inches which nature bestowed upon him. Even as it was, he tried in every way to make up for the slight or oversight of nature by carrying his head high in the air and stretching every inch of his small stature as far as he could heavenward, but it only gave him a conceited appearance instead of the imposing presence he was after. Stub did not object to a small figure for the reason that he believed it was inferior to a large one or contained a less worthy spirit. What he did object to was the unconscious deference paid to a man of commanding stature, as though the dynamic force stored up in a large bulk made its presence felt through the mass; while a small man had to prove his worth to an indifferent and incredulous world. He had seen its effect time and time again, when small men, waiting for a chance to be heard, were brushed unceremoniously aside by large men with protruding stomachs, who fitted as naturally into the usurped places as though they rightfully belonged there, and were given immediate audience, while the smaller men waited. Nay, he himself often had felt the effacing influence of another presence, when a large man, towering head and shoulders above him, looked down in a kindly way, as to a boy. In his work as journeyman plumber he had not noticed the difference so much, but now that he was promoted to estimator and met all kinds of people the matter was forcibly brought home to him.

But it was in his social life that he felt the difference the more keenly. A fond, doting mother had bestowed upon him the name of Hector. Hector, the defender! Of all names to bestow on five feet three inches. Nothing more fiendishly cruel could have been devised had his parents sought to heap ridicule on him through life, and his social enemies were not slow in seizing upon the weapon to humiliate him all they could.

Something to that effect was passing through his mind now as he wended his way disconsolately back from the lake shore to the hotel. He had been walking along the shore with Miss Oliver, one of the guests, in whom he took more than a passing interest, when an acquaintance came to claim her for a boat ride. It was not the fact that she went with Herbert Wright which angered Stub, for he knew it was in fulfilment of a prior engagement. What he did resent was the cool air of proprietorship with which this big booby had carried her off, without bestowing a glance upon him, as though he were too insignificant to be noticed.

"And to think," he muttered, clinching his fists, "that I could knock his confounded block off as easily as though he were a kid, if it were not considered uncivilized to do so. Why, the big blockhead," he continued, growing angrier all the while, "what did he ever do in all his life to entitle him to such airs as he puts on? Nothing," he replied, answering himself, "only spend the money that a lucky strike in oil gave to his fool of a father. Yet, because he has a big hulking body he lords it over me as though I were nobody."

By this time he was in view of the hotel, and the sight of scores of people rocking in the shade of the porch was maddening to him in his present mood, so he swung off into a by-path which skirted the lake, but some distance from the shore.

"Twitted me last night on the porch," he ran angrily on, picking up a stick and lunging angrily at bushes as he passed, "about being small. She said that size didn't matter so much as the character and spirit which dominated the body; that a small figure could be trained until its muscles and sinews were like steel, and that would be better than a big body with muscles of cast iron."

His thoughts were interrupted at this point by two rough looking men, who appeared near him at the side of the path and made some remark, but he paid no heed to them, outside of uttering a growl, which showed unmistakably the ugly mood he was in.

"Huh," he snorted, forgetting the men as he thrashed along, beating the heads off wild flowers with his stick, as though each decapitation was the finishing stroke to his tormentor and rival, "he's big all right, but if the face is any indication of character and I am any judge of faces, that sap-head is a coward, if ever there was one, and I have half a mind to frighten him into a shriveled up mummy by jumping suddenly in front of him some dark night, shouting 'Boo'!"

During the time that Stub had been communing with himself he had walked rapidly, and now found himself near the lower end of the lake. Turning,

he retraced his steps, walking more slowly and thinking more lucidly, as his anger died away. At a small indentation in the shore where the water was shallow and the bottom muddy he stopped to gather some water lilies, which he sat down on the bank to make up into a bouquet. Strolling leisurely along after that, it was growing dusk in the woods when he again found himself back in the vicinity of the hotel grounds. He was about to quicken his pace to get back and dress for dinner when he was startled by a wild scream from the woods nearby. Pausing an instant to learn the direction from which it came, he heard another scream suddenly choked off and dying in a gurgle, then the rustling of underbrush as though a heavy body were tearing wildly through the woods. Grasping his stick more firmly in his hand he started on a break-neck pace in the direction of the scream. Part way there he met the flying Wright, terror depicted on his countenance, which was torn and bleeding from the underbrush. "Save me," he yelled wildly, throwing himself at Stub's feet. Whack! came Stub's stick contemptuously down on that part of his anatomy made to be kicked, while, without stopping he sped onward to where he heard a struggle going on. Reaching the scene he laid about him lustily with his stick, with such good effect that the two men were soon put to rout. Then, triumphantly, he led the girl back to the hotel porch, where his brazen rival was telling how he had put six big men to flight, and had only quit when laid low by the big stick of one of the assailants.

But there was one present who knew the truth, and Stub was happy, for in her eyes at least he had made good.

WHAT IS NOT TRUE HAS NO EXISTENCE.

There was once a banker in the days of wildcat currency who had a wonderful skill in detecting counterfeits. He acquired the skill, not by studying counterfeits; he studied good money. Whatever was not good money was not money at all to him. It was mere waste paper, not worth even the name of counterfeit. So to detect error one must study truth; the rest is waste and rubbish. To know a good man when you see him you must study good men. All short of this is bad. To know good work you must study good work. The rest is frivolity and commonplace. * * * If your college spirit is not the real thing, if it is counterfeit, it is no spirit at all. It is nothing at all but a bit of noisy shamming. There is no counterfeit money. What is not money is not money at all. So with college spirit, what is not genuine is nothing. So with one's efforts in life; what is not honest, what is not real has no existence.—David Starr Jordan, in an address before the graduating class of 1908, Sanford University, California.

The Bursting Point of Flange Fittings

(Explanatory notes to "Data Sheet" on opposite page.)

Some time ago Crane Co. found it desirable to establish, by actual destruction, the ultimate strength of fittings of various kinds. For this purpose it was decided to burst one to seven fittings of each size under conditions which, as nearly as possible, would establish their true strength. All tests were made by bolting blind flanges to the openings of the fittings admitting water through a small opening in one flange. Each fitting was cast with a key number for the purpose of identifying the date and heat for comparison with test bars run out of the same ladle. This gave a check against any fitting which might show strength and weakness beyond the average. The test bars were found to run very uniform, the variation in thirty heats being 20 per cent between the highest and lowest bar, and the average variation being only about 5 per cent. The bars averaged in tensile strength: Ferrosteel, 33,000 lbs. per square inch. Cast iron, 22,000 lbs. per square inch. The results of the destructive tests are shown on the opposite page.

No attempt was made to determine the strength of cast iron pipe, but as a matter of information one piece of 12-inch pipe was made and burst, with a result practically the same as an elbow. If this be true of all sizes and no reason to doubt it, then the rule laid down by Rankin, "Civil Engineering," page 721, viz., Thickness equals radius, x pressure, divided by the tensile strength, is entirely erroneous. This same formula is also given in Kent's "Mechanical Engineer's Hand Book," page 190, and is the accepted formula for wrought steel tubes.

Using the tees as a basis and a factor of safety of five, the thickness of metal required safely to withstand a head of 3,400 feet would be 5 inches, if the metal carried its strength through such a thick section, which is not probable.

The doctors, however, do not agree upon a safe working thickness as will be seen by the following comparison:

12-in. Pipe—3400 ft. Head—Safe Working Pressure.

No. 1—Shedd	3.744	inches.
No. 2—Warren Fdy	2.9036	"
No. 3—Francis	2.8608	"
No. 4—Dupuit	2.4344	"
No. 5—Box	2.128	"
No. 6—Whitman	5.894	"
No. 7—Fanning	2.907	"
No. 8—Meggs	6.307	"

The rule given by Rankin using a tensile strength of 22,000 lb. and a factor of safety of five gives a thickness of only 2 inches, which in the light of the above tests is only equivalent to a factor of two instead of five.

She Was Next.

Him: "I was reading in the paper today where one of these food cranks says that a couple can live comfortably on $3 a week. Do you think that possible?"

Her: "No, Archibald, I do not. But I'll be a sister to you."—Cleveland Leader.

The Man in the Moon.

A five-year-old boy, with his hands thrust deep in his pockets, stood on the front porch, watching the full moon rise. "Mamma," he ventured, thoughtfully, "I know why there is a man in the moon!"

"Why, son?" asked the mother listlessly.

"Why, there had to be some one there to put out the light when daytime come, and God knew it would take a man to do it."—The Circle Magazine.

Domestic Engineering's Data Sheets

18
Dec. 12, 1908

These sheets may be had printed separately for preservation in a binder. Price 10 Cents
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The Bursting Point of Flange Fittings*

(An Investigation by Crane Co. Condensed from The Valve World.)

Extra Heavy Fittings—Tees.

Size Inches	Body Metal Inches	Burst Ferrosteel Lbs. Per Sq. In.	Average	Burst Cast Iron Lbs. Per Sq. In.	Average
6	3/4	2700			
6	3/4	2500		1675	
6	3/4	3000	2733	1700	1687
8	13/16	2100			
8	13/16	2250			
8	13/16	2250			
8	13/16	2100			
8	13/16	2500		1200	
8	13/16	2300	2205	1500	1350
10	15/16	2200			
10	15/16	2200		1225	
10	15/16	2100		1300	
10	15/16	2000		1200	
10	15/16	2300	2160	1500	1306
12	1	2200			
12	1	2100		1100	
12	1	2000		1400	
12	1	2000		1500	
12	1	2100		1450	
12	1	1800	2033	1450	1380
14	1 1/8	1900			
14	1 1/8	1750	1825	1100	1100
16	1 3/16	1700		1050	
16	1 3/16	1700	1700	1000	1025
18	1 1/4	1600			
18	1 1/4	1300	1450	600	600
20	1 5/16	1400			
20	1 5/16	1150	1275	750	750
24	1 1/2	1300	1300	700	700

Extra Heavy Fittings—Ells.

Size Inches	Body Metal Inches	Burst Ferrosteel Lbs. Per Sq. In.	Average	Burst Cast Iron Lbs. Per Sq. In.	Average
6	3/4	2800			
6	3/4	3500		2350	
6	3/4	3500	3266	2200	2275
8	13/16	2700		1700	
8	13/16	2800		1600	
8	13/16	2800		1500	
8	13/16	2600	2725	1700	1625
10	15/16	2550		1625	
10	15/16	2000		1400	
10	15/16	2500	2350	1600	1541
12	1	2000		1275	
12	1	2200		*900	
12	1	2200	2133	*700	1275
14	1 1/8	1700		900	
14	1 1/8			1250	1075
16	1 3/16	2100		1250	1250

*Defective, eliminated from total.

Average of all averages: Ferrosteel, 2,066 lbs. per fittings; cast iron, 1,263 lbs. per fitting.

Ferrosteel fittings show stronger than cast iron 63.70 per cent. Ferrosteel bars show stronger than cast iron 50 per cent.

Standard Cast Iron Fittings—Tees.

Size Inches	Body Metal Inches	Bursting Cast Iron Lbs. Per Sq. In.	Average
6	9/16	1700	
6	9/16	1500	1600
8	5/8	1150	
10	3/4	1100	
12	13/16	700	
12	13/16	850	775
14	7/8	700	
16	1	750	

Standard Cast Iron Fittings—Ells.

Size Inches	Body Metal Inches	Bursting Cast Iron Lbs. Per Sq. In.	Average
6	9/16	2000	
8	5/8	1500	
10	3/4	1200	
12	13/16	900	
14	7/8	900	
16	1	850	

For the purpose of more accurate comparison betweeen the bursting point of fittings and the tensile strength of test bars cast at the same time, a few examples of 12-inch extra heavy tees are given:

12-in. Extra Heavy Tees.

Burst Ferrosteel Lbs. Per Sq. In.	Tensile Strength of Test Bar Lbs. Per Sq. In.	Burst Cast Iron Lbs. Per Sq. In.	Tensile Strength of Test Bar Lbs. Per Sq. In.
2100	33,710	1450	*21550
2200	32,690	1500	22190
2000	32,630	1450	22940
2100	34,070		
2000	33,200		
1800	31,730		
12200 Total	198,030 Total	4400 Total	66680
2033 Average	33,005 Average	1466 Average	22,226

*Flaw in test bar.

When making the fittings for these tests no special care was exercised in the foundry, each piece being made in the regular way.

Using these destructive tests as a basis it is now possible to formulate a rule which applied to flanged fittings can be used to determine the thickness of metal for a given pressure, or the metal being known, the pressure required to rupture. Taking flanged tees as a foundation, as elbows are stronger in form, and a formula which will apply to tees will be safe for most of the conventional forms. The rules proposed are:

Rule No. 1.—Thickness of body metal being known to determine the bursting point:

$$\frac{T}{D} \times S = B$$

T = thickness of metal.
D = inside diameter.
S = 65 per cent of tensile strength up to 12 inches diameter; larger sizes use 60 per cent.
B = bursting point.
For working pressure divide result by a factor of safety of 4 to 8.

Rule No. 2—Bursting point being given to determine thickness of metal:

$$T = \frac{B \times D}{S}.$$

These rules work out fairly well on all sides, but it is not to be expected that they will apply absolutely to every individual fitting as there are always some irregularities in castings and the final strength of the metal in the fittings is influenced by many things, such as the condition of the sand, fluidity of the iron, etc.

A comparison of the theoretical bursting point shown by the proposed rule and the actual results is given below:

Extra Heavy Flanged Tees.

Size ID Inches	Body Metal	FERROSSTEEL 33000 T. S. Av. B P Lbs. Per Sq. In.	Lowest B P Lbs. Per Sq. In.	B P Per Rule Lbs. Per Sq. In.	CAST IRON 22000 T. S. Av. B P	Lowest B P	B P Per Rule Lbs. Per Sq. In.
6	3/4	2733	2500	2675	1687	1675	1787
8	13/16	2250	2100	2172	1350	1200	1450
10	15/16	2160	2000	2172	1306	1200	1340
12	1	2033	1800	1782	1380	1100	1291
13¼	1 1/8	1825	1750	1584		1100	1120
15¼	1 3/16	1700	1700	1467	1025	1000	976
17¼	1 1/4	1450	1300	1433		600	955
19¼	1 5/16	1275	1150	1348		750	899
23¼	1 1/2	1300	1300	1277		700	851

* See Note on opposite page.

In Early Days—XIV

By Herbert S. Renton

The Period of the Washout and Pneumatic Closets

In 1886 I attended the master plumbers' convention at Deer Park, Md. It was a notable and never to be forgotten gathering. Grover Cleveland was spending his honeymoon there at the time. I haven't been at a national convention since, but I remember another conclave in the same year at Trenton, not large in numbers, but representing pretty thoroughly the plumbing fraternity of New York City, whose object it was to secure a washout closet which could be used by the trade as the best closet obtainable, because combining the features desired by all of the craft who chose to go down to the potteries and say what was needed. I was commissioned to place the order with the Enterprise Pottery Company, when it should have been determined what was wanted. Many of the most prominent plumbers in New York went down to Trenton together—Thos. J. Byrne, John Toumey, Edward Murphy, Nicholas Gerity, John Renehan, James Gilroy, Michael Sexton, Wm. H. Quick, George Brown, John Byrnes, Frank Reynolds, George Cummings and George B. Lewis, of Brooklyn, and several others. I was to make my own price, and sell in the regular way.

These representative men went over the various points—the size, the shape, the flush, the dish of the bowl to hold water and all the rest of it. It did not take very long. I ordered a model and the Enterprise Company turned out the "Ejector," illustrated on page 54 of Renton Brothers' catalogue of 1885. One of the features claimed when the "Ejector" was catalogued was: "The bowl holds more water than any other, but not enough to produce a splash when in use. A perfect flush, which the name implies." The outlet was at the back, and the catalogue declared that "When the seat is on the **outlet is not in sight**, a feature that other makers have tried to obtain by bringing the trap round in front, on the side, etc."

Another thing suggested by the plumbers in congress assembled was a slop sink. Meyer-Sniffen Company and Mott had the only ones, and they were all made on the other side. Mr. Umpleby, the superintendent of the Enterprise Pottery, agreed to try his hand. He got four good ones out of several kilns, but finding that he could not depend on getting ten per cent good, Mr. Umpleby gave it up as a bad job. I paid $80 for the slop sink mold alone and got four sinks that it had cost the Enterprise $80 apiece to make, at least. T. J. Byrne took the four. I recall that Henry P. Read, who was bookkeeper for Byrne in 1886, sent the slop sinks back and I had two cartages on them. As they represented trouble, I did not try to make any more porcelain slop sinks, but stuck to washouts and hoppers. The first order was one hundred and the price $1,000 for "Ejector" washouts, and the cartage, cratage and freight, as well as brass couplings, were extra. I saw one of these "Ejector" washouts some time ago, and it looked huge and clumsy. It was half again as large as the washout of today. The potteries made three sizes of washouts, called number one, two and three. Then style was introduced, and pedestal, embossed and colored, flooded the market. The "Brighton," sold by the Meyer-Sniffen Company, was one of the earliest washouts. The advertisement said, "We believe they are the best water closets, **all things considered**, yet made, of the class known as without mechanical parts. The bottom of the bowl is covered with water, while the flush, coming in through the two arms, as shown,

The "Ejector" all earthenware washout closet.—Illustration from Renton Brothers' 1885 catalogue.

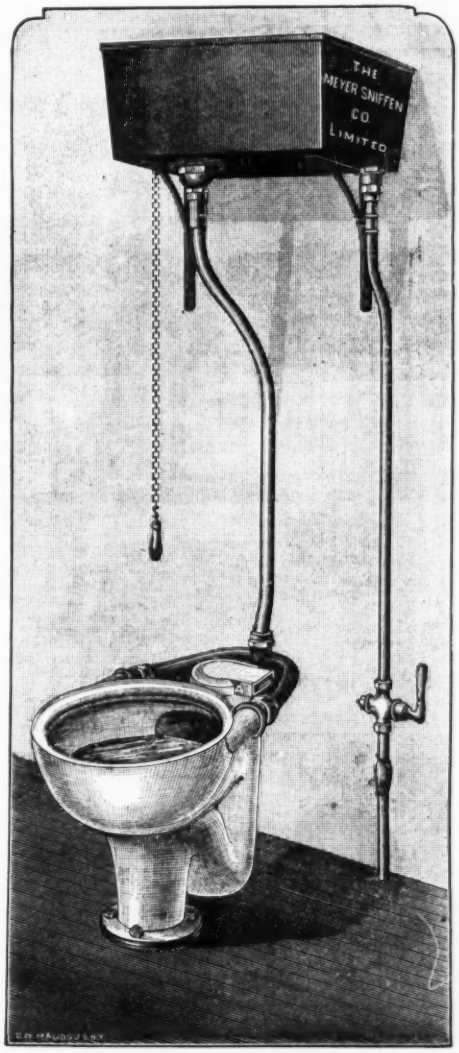
and the shape of the bowl is such that the trunk on the back is kept perfectly clean. These closets have had a large sale in England and America for the last seven years." Then follows this statement, with a rather queer ending. Evidently they foresaw the decline of all mechanical closets. "We have had them in use in our factory, in some of the finest private and public buildings and large railroad depots nearly four years, and we now offer them to those who prefer a different form of water closet than the **'Hellyer,' which, by the way, does not, in a single instance, so far as we know, fail to satisfy those who have them in use.**" This seemed like bolstering up a lost cause—and it was, for the mechanical "Hellyer" had to go with the Zane and the Demarest into oblivion.

One sentence about brass work in this old Meyer-Sniffen Company's catalogue is suggestive: "To those persons **anxious** to use a better grade of goods than are usually sold, we will be pleased to quote prices; at the same time we respectfully ask parties who are merely looking for the cheapest articles, regardless of quality, not to write to us for catalogues and price lists, as we make no pretensions to sell brass work of our manufacture as low as the lowest."

James Conity, who ran the brass shop for Meyer-Sniffen Company, was a very fine man. I was acquainted with him and a customer of his when he left the old concern and started for himself, making quality brass work, basin legs, connected wastes, etc. Mr. Conity was a man of portly figure, handsome and genial, and enjoyed life intensely. The very fact of living was a pleasure to Conity. One of his sons told me that in his last illness the doctor told him that he must go; he looked up with a sweet, serene smile and said, "Well, I've had a grand good time, anyway!" and in a little time he was gone. James Conity will not be forgotten as a good citizen and first class mechanic. It took the washout seven years to get well in the field against the old closet engines, and it has had an enormous run in the past twenty-five years. Today it is the staple in cheap work in New York and elsewhere, but Chicago, as I have previously stated, will not allow it unless revented. J. J. Wade, who was one of the earliest advocates of exposed plumbing and who exposed the old, covered-up method pretty well, started the system of reventing in Chicago. In the old days many of the houses in Chicago stood on 8x8 or 12x12 blocks, and the quality of the plumbing was not sanitary. With everything to contend against, Chicago has developed some men of high character and purpose in the plumbing trade, and more than one reform has started there. But what the visitor often wonders at is that some malign influence seems to stand in the way and prevent the carrying out of express rules and regulations. Meanwhile the law against the poor washout is enforced, unless revented, which, of course, is so expensive that it amounts to a prohibition. Evidently the washout has no pull, not even on the tank.

But, not to wander too far afield, let us look at a patent that was the precourser of the present syphon closet. It is dated March 28, 1882, bears No. 255,485 and was granted to James E. Boyle. This was the first American patent for any pneumatic closet. This is the way the description reads in Hubers' catalogue, 1882, Boyles' patent "Tidal Wave" water closet. "For the last twenty-five years it has been the constant and persistant aim of hydraulic and sanitary engineers in America and England to construct a water closet in which the never-failing laws of nature should perform the functions that so far had been assigned to a complicated system of mechanical parts. This long felt want for a self-emptying, automatic water closet that would take care of itself, be simple and positive in operation, clean in use and perfect in a sanitary point of view is now successfully met by the 'Tidal Wave' water closet. This closet is made of one piece of white earthenware, and its construction conforms to the most stringent of sanitary laws, dispensing with plug, soil valve, floats, float chambers, putty and cement joints and complicated supply valves. A large body of water is retained in the bowl by a trap of unusual dip, under any circumstances, while a second trap directly under the bowl, in connection with the vent at D, forms an additional safeguard against sewer gas. The closet is a waste preventer. It is supplied from a copper lined cistern of the usual construction, and can be operated by lever and chain attached to closet seat in the usual manner, or by a bell pull. We consider the seat attachment to be the best, for the reason that the operation becomes strictly automatic and especially adapted for the use of children and others too thoughtless to make use of mechanical devices."

Its operation is described as follows: "Below we show the simple arrangement of working the 'Tidal



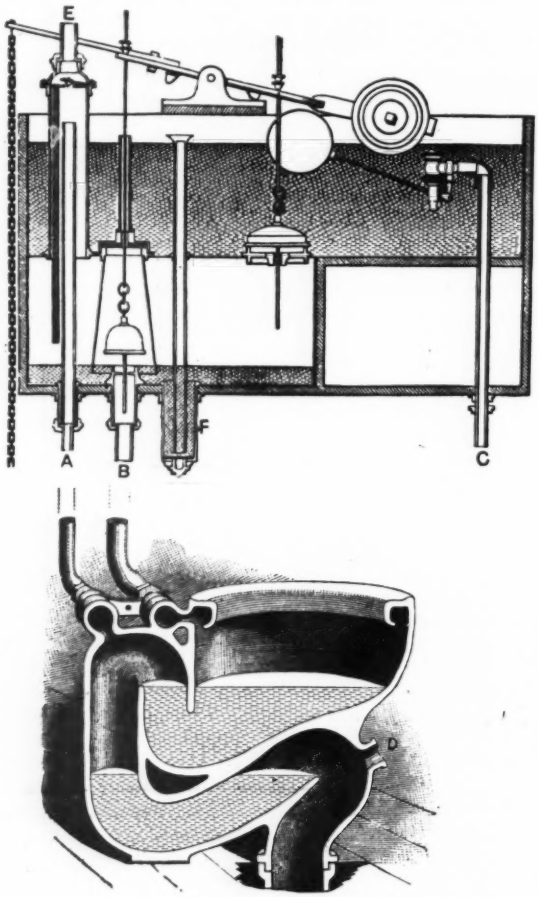
The "Brighton" washout water closet.—Illustration from The Meyer-Sniffen Company's 1884 catalogue.

Wave' by seat attachment. While the seat is occupied the service box fills, the water expelling the air from the service box into the ventilating flue at E (top of cistern). Relieving the seat changes the position of the valves in the service box, closing the supply and opening the outlet valve to the flushing pipe B. The water, rushing down to the flushing rim of the bowl, creates a partial vacuum in the service box and air pipe A, causing the air between the two traps to rarefy, and,

as a natural consequence, the contents of the bowl are instantaneously discharged into the lower trap, starting at the same time a continuous four-inch siphon, which carries everything with it into the soil pipe. The vacuum is broken after the water in the service box has run off to the extent of two-thirds, and the remaining one-third of water in the service box is reserved to refill the bowl."

This throws the work all into the cistern.

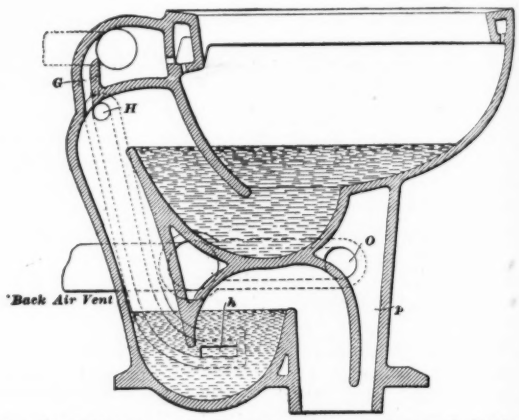
There was an iron tank for dipping castings in our foundry in Brooklyn, when Capt. Boyle was with us



Sectional view of Boyle's patent "Tidal Wave" water closet, patented March 28, 1882. Illustration from Henry Huber & Co.'s 1882 catalogue.

in 1872, ten years before this patent was obtained. There was a faucet over the tank, but no outlet. To empty the water a bent piece of pipe was used, to form a siphon, and the water was run off into a trough and out through a hole in the wall to a yard. To start this siphon one had only to dip the pipe in the water, expelling the air and filling it with water; then, hanging the pipe over the side of the tank, it would siphon out the water in the tank clear to the bottom. Capt. Boyle often saw me do this and remarked on the wonderful principle of the siphon, and I have thought that perhaps the germ of his "Tidal Wave" was in his mind even then.

A curious feature of Boyle's "Tidal Wave" was the air pipe **through the tank.** Through this the air was sucked up by the falling water, creating a partial vacuum between the two water seals in the limb of the bowl; then the air in the room, being heavier than that in the confined space, started a siphon and emptied the bowl. Then the same air pipe was relied on to break the siphon by the admission of air after two-thirds of the water had been discharged from the service box. The Cascade, Trombe and Flume closets, made by Huber, were modifications of the "Tidal Wave," requiring a trap under the floor. The cost was in the neighborhood of $75, net, to the plumber for a "Tidal Wave," with all the fixings. A cheaper form called the **Geyser,** with plain tank, cost a third less. Then a still cheaper one, called the **Fountain**—a bowl mounted on an iron trap, cost $37.



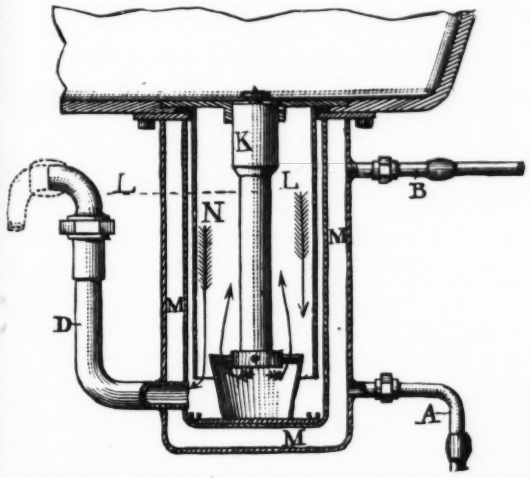
The Surf Siphon closet, patented by Capt. James E. Boyle. Illustration from Henry Huber Co.'s 1893 catalogue.

The seven claims of the Boyle patent cover broadly and in detail the means for exhausting the air from the sealed space between two traps, consisting of the closed flushing chamber formed in the flushing tank, the running out of water from which to flush the closet creates a vacuum and draws air up through the air pipe, in connection with the indispensible means for stopping the suction action toward the end of the operation to enable the bowl to refill. The patent also claims broadly the construction of the bowl with its two traps of one piece of earthenware. Now this double trap proved to be defective after a while, as it would get air-bound sometimes, in spite of all the siphon action. Boyle did not live many years to enjoy the fruit of his inventions.

Henry Huber & Company, in their 1893 catalogue, illustrated a siphon jet closet, the Surf, also Boyle's patent, and it is stated that it differs from the **pneumatic** in that the bowl is flushed by the action of a siphon formed in the soil passage, aided by a **water jet** diverted from the flushing connection and diverted into the air passage between the traps. "When operated, only a portion of the flushing water flows into the rim

of the bowl; the remainder falls down the jet opening G, through the air space, and compresses the air therein. This compression is instantly relieved by an escape of air through the passage H, which bubbles up from the opening h and enters the passage on the discharge side of the lower trap. The jet effects a rarefaction in the upper part of the air space, drawing the air down with it, and the bowl discharges instantly."

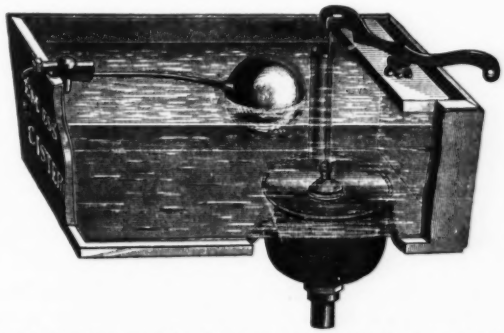
The siphon action of the "Surf" was very strong, and continued as long as there was a full downflow of water. As the flushing decreased the siphon was broken by admitting air into the air space through the outlet of the bowl. The bowl was then refilled with a quick afterwash. The bowl was ventilated through a passage (marked P) and an opening (marked O), and the external passages on both sides of the bowl leading to the back. Boyle's Patent Reversible Back-air Connection was used to facilitate either right or left



Sectional view of the Tucker grease trap, reproduced from the Meyer-Sniffen Co.'s 1884 catalogue, where its operation is described as follows: "The grease is retained in this trap in the following manner: The waste water passes down the tube K, following the course shown by the arrow in the waste pipe D. The depth of the standing water is indicated by the line L. Cold water circulates in the jacket M. It enters from the cold water pipe A and passes out at B; this has the effect of chilling the grease in the compartment N. The grease being on top naturally increases in depth until it occupies this space, when it prevents the water passing into the pipe D. This will be indicated by its failure to run off. The chamber N with the tube K can then be lifted out and the cake of grease removed. The parts can then be put back and again used until it is necessary to repeat the operation.

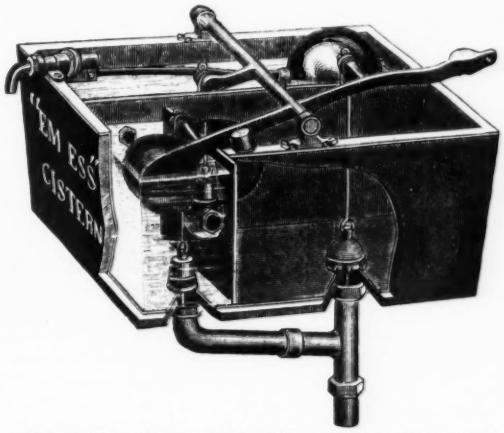
hand ventilation, as desired. Huber succeeded the ancient firm of W. S. Carr & Company, and Boyle was the backbone of the institution. In 1893 Mr. Huber was out of the concern and Boyle's busy brain was still. One of the first officers of the Henry Huber Company has been for some years with another large concern, noted for the superior quality of their goods. A plumber came to him recently and said, "Those goods you sent me are rotten." The answer was, with a smile and a strong German accent: "De vord is in de dictionary, but it is not a nice vord," and that is all the satisfaction the plumber got, or, perhaps, in this particular case, deserved.

The Em Ess—Meyer-Sniffen—cisterns were of wood, lined with cast lead the prospectus says, "Cast in one



The Em Ess cast-lead cistern, capacity 8½ gallons, size 25x14x10 inches. Illustration reproduced from the Meyer-Sniffen Co.'s 1884 catalogue, where it is described as follows: "Intended for the Hellyer or any of the leading styles of modern water closets. Cast extra heavy, entirely in one piece, from virgin pig lead, without any seam, joint or solder; supported in strong wood cisterns, and is not liable to burst as would iron cisterns, if exposed to frost."

piece from virgin pig lead, without any seam, joint or solder." The working parts have brass bearings. These cisterns will not rust and the water from them will not discolor the bowls of the water closets. The rush of water from a wooden cistern, lined with lead, occasions less noise than from a cast iron one."



Another type of Em Ess cast lead cistern, shown in the Meyer-Sniffen Co.'s 1884 catalogue. This cistern is described as securing "a preliminary flush of half a gallon, which wets the inner surface of a hopper thoroughly, followed by a two-gallon after-flush when the seat is relieved of weight."

Another fixture of Meyer-Sniffen manufacture, was the Tucker Grease Trap, invented by John Tucker, then foreman for Thos. J. Byrne, afterward a partner with Byrne and for years in business alone at 4th

avenue and 20th street. Mr. Tucker also invented the Diaphram Self Closing Cock made by Peck Bros. & Co. He passed away only a few months ago; his business is carried on by his sons.

Wholesale Plumbing

The Star Expansion Bolt Company, of Bayonne, N. J., has opened a branch office at 61 Second street, San Francisco, in charge of H. M. Estes. A complete line of the company's products will be carried in stock.

The Sanitary Appliance Company, recently organized at Neenah, Wis., to manufacture water closet ventilators has been incorporated with a capital of $25,000 The following officers have been elected: President, J. J. Leutenegger; vice-president and manager, Antone Leuckenbach; secretary, E. J. Lachmann; treasurer, S. B. Morgan.

When the new traffic rates go into effect on January 1, 1909, the rate on pipe and pipe fittings to the Pacific coast will be increased, it is reported, and dealers there are much interested in the developments along these lines, and some of them have joined in the protest that has been lodged with the Interstate Commerce Commission. Commencing with the first day of the new year, Chicago will be allowed a 15 cent lower rate than is to be allowed from points east of here, and this action has not been received with much satisfaction by firms on the Pacific coast operating in sections further east. For years the rate on pipe fittings has been a blanket rate of $1 for all the eastern manufacturing centers, and it is charged that the change has been made to please certain manufacturers of Chicago and vicinity. It is asserted that there are fully as many fittings sent to the Pacific coast by manufacturers outside this limited district that will have to meet the differential or go out of business, as far as the coast trade is concerned. It does not seem likely that the firms protesting against the tariff will win their case, as it is pretty generally known that most railroad men are opposed to a blanket rate, and it may be accepted as a foregone conclusion that the rate will stand as printed in the new tariff.

Wholesale Heating

The Steam Trade's Indoor Base Ball Association held its regular semi-monthly meeting on Monday evening, December 7, at the New Illinois Athletic Club. Following the dinner at the round table in the grand dining salon an indoor baseball game was played in the gymnasium. The line-up was as follows:

Stackhouse	Pitcher	Cook
Hays	Catcher	Drury
Capron	1st Base	Lamb
Jackson	2nd Base	Dickinson
Newport	3rd Base	McClellan
	Short-stop	Fishwick

The team headed by Mr. Stackhouse won by a score of 46 to 22. The evening's sensation was Drury's base running, which was so far above the average that it was found necessary to handicap him by compelling him to run with the bat.

Williamsport Radiator Company, of Williamsport, Pa., has recently made several extensive improvements to its factory, such as the installation of a new 78-inch cupola, a new blower, a new engine and boiler, doubling the capacity of its foundry. The company is also planning to install an electric generator in its factory to furnish light and power.

C. S. Redfield, advertising manager of the Yale & Towne Manufacturing Company, has recently addressed the Technical Publicity Association upon the subject of the trade press of America. He says: "Its mission is a definite one in America and its place in the business world a definite place." Mr. Redfield has certainly expressed a great truth, but one which many manufacturers and wholesale dealers have failed to recognize. The influence of the trade press is constantly growing more powerful in those cases where the publishers recognize the opportunities which lie before them and endeavor to live up to them.

Steam and Mill Supplies

FOR BETTER TRANSPORTATION FACILITIES BETWEEN NORTH AND SOUTH AMERICA.

The paramount necessity of the present day for the republics of North and South America is fast mail, passenger and express steamers from one to the other, according to John Barrett, director of the International Bureau of the American Republics. In his annual report this week he emphasizes this need and urges the United States to do her part toward correcting present conditions. In order **to make the exchange of trade between the republics what it should be** Mr. Barrett says that **transportation facilities must be improved without unnecessary delay,** and he explains that he is not necessarily advocating the so-called "subsidy" program. "It is simply stating the facts as to present conditions," he adds. "Whether they come with or without a 'subsidy' is not for the Bureau of International Republics to say. It is simply a question of doing something, doing it well and doing it quickly. No other institution or organization in America has such opportunities of realizing this situation as the International Bureau of American Republics, and what it says expresses the sentiments of a large majority of the men who understand the field and the conditions that surround it." The point is made in the report that as no cities, states and sections of the interior of the United States can get close together without first-class railway facilities, so no cities, nations and sections of Pan-America can develop intimate and prosperous conditions of trade and mutual good will without first-class steamship facilities. "The business men, the buyers and sellers, the travelers and tourists and the people of the world at large are never going to travel back and forth between the Atlantic and Pacific seaboards of the United States and Latin America until they can make the journey speedily and comfortably," suggests Mr. Barrett. "More representative men of the great city of Buenos Ayres proceed in one week to Europe on the excellent vessels that connect that port with Southampton, Cherbourg, Hamburg and Barcelona than go direct to the United States in a

whole year upon the slower-going semi-freight steamers that connect the metropolis of Argentina with New York." All countries of Europe, and even Japan, are actually doing more today to foster trade with Latin America through first-class mail, passenger and express steamships than is the United States, which prides itself on its energy and greatness, the director continues. He points to the example Peru has set the United States in putting on a line of new and fast steamers to run from Callao to Panama, and says it is to the credit of Brazil that it is assisting a line flying the Brazilian flag to keep up service with the United States. Attention is called to the remarkable growth of Latin-America's foreign trade of over $100,000,000 per annum, and after an analysis of the trade between the United States and her sister republics an optimistic view of the future is taken, notwithstanding the need for improved and increased water communication.

The Gas Appliance Exposition

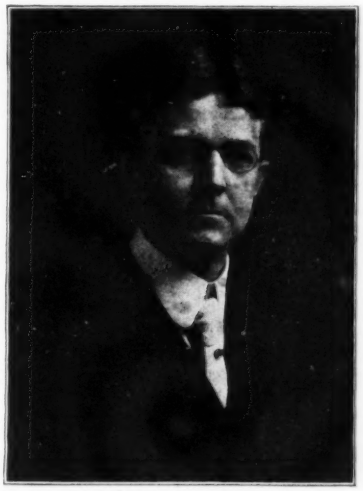
The **National Commercial Gas-Association held its annual convention** in the First Regiment Armory, Chicago, on Tuesday, Wednesday and Thursday, December 8, 9 and 10, and the meeting was probably the best success in the history of the organization. **Interesting and valuable papers were read** by men who know "the why and the how," the most notable of these papers being: "Industrial Fuel Gas and Special Appliances," by A. Tully Wilson, of Denver; "Exhibition of Appliances a Necessity in Purchasing," by Herbert L. Doherty, of New York City, and "Compiled Record of New Business Methods," by George Williams, of New York City.

The social side of the meeting was not neglected, a public reception being tendered the delegates and their ladies by the association on Monday evening at the Armory, in Exhibition Hall. On Tuesday evening theater parties were given in their honor, and on Wednesday afternoon the ladies were entertained at matinee parties. By invitation the ladies were also escorted through Marshall Field & Co.'s store on Thursday afternoon, and enjoyed a social tea there.

The Exposition.

But the feature that overshadowed everything else, or at least came near doing so, **was the Gas Appliance Exposition** held in connection with the convention. This exposition was held under the auspices of the National Commercial Gas-Association and the American Gas Institute. It was held in the First Regiment Armory, and began Monday evening and will close tonight (Saturday, December 12). The marvelous advance in the methods for the utilization of gas was exploited in the most thorough manner in the exposition which was so well planned that it brought together under service conditions all appliances used in the production of illumination and all appliances for the utilization of heat, and the methods of using gas for power was also displayed as nearly as possible under service conditions. Means of applying gas in manufacturing processes, and agencies for giving gas its place as an adjunct to architecture, decoration and art, were also covered most thoroughly. The particular feature which elicited laudatory remarks from visitors in the evenings was the brilliant illuminative effects in and outside the building. The inside of the huge hall was filled with a glow of over a hundred arc lights and artistic fixtures. A transparent gas meter on exhibition also caught the eye of the curious who strolled the aisles inspecting the displays.

The committee of arrangements which worked out the multitudinous details of the exhibition with such signal success consisted of A. Cressy Morrison, manager; Jno. C. D. Clark, chairman; C. E. Ummach, secretary; all of Chicago. These gentlemen carried the greater part of the responsibilities with great credit



A. CRESSY MORRISON.

Manager of the Gas Appliance Exposition held this week in Chicago.

to themselves, and they were ably assisted by F. J. Rutledge, of Milwaukee; H. D. Schall, of Chicago; W. J. Serrill, of Philadelphia; V. F. Dewey, of Detroit; H. L. Rice, of Aurora, Ill., and J. Edward Maass, of Chicago.

Exhibitors and Exhibits.

The following is a complete list of exhibitors, the appliances shown and names of parties in charge of the exhibits:

Toledo Pipe Threading Machine Company, Toledo, O. Pipe threading and cutting tools. Frank Collins, W. A. Longnecker and W. Vosburg, in charge.

H. Mueller Manufacturing Company, Decatur, Ill. Gas goods, such as gas tapping machines, gas cocks for meters, service and high pressure, etc.; die stocks. Adolph Mueller, Fred Mueller, Robert Mueller, Philip Mueller, F. L. Hayes and Mont. Whitney, in charge.

Nye Tool & Machine Works. Chicago. Pipe threading dies and stocks. Milt Mayer in charge.

Pittsburg Water Heater Company, Pittsburg, Pa.: Automatic instantaneous water heaters and Lion tank heaters. R. C. Frampton, president; Ira J. O'Malley, Chicago; Lee B. Mettler, Kansas City; W. Frazier Stewart, St. Louis, and C. H. Ehrenzeller, Philadelphia,

in charge. (Mr. O'Malley, by the way, sprang a neat surprise on the district agents of this company by presenting each with a lion head set with diamonds.)

Humphrey Company, Kalamazoo, Mich. Automatic water heaters. Herbert S. Humphrey, A. M. Honnet, W. P. Fairbairn, W. J. McCartney, in charge. Distributed attractive ash-tray souvenir.

R. Williamson & Company, Chicago. Gas and electric combination fixtures. Charles Ummach and Charles Baron, in charge.

Dean Heat Distributor Company, Philadelphia. Heat distributors for use on gas ranges. J. Bennett and Miss Anderson, in charge.

Chicago Dryer Company, Chicago. Combination clothes dryer and laundry stove. M. E. Johnson and F. T. Johnson, in charge.

Auto Flame Gas Burners Company, New York. Gas flame burners. George F. Barclay and Mrs. F. E. Zimmerman, in charge.

McLain Garwood Company, Canton, O. Steam heaters. E. F. Bachman, in charge.

Eclipse Gas Stove Company, Rockford, Ill. Gas ranges, heaters, water heaters, laundry stoves, broilers, bake-ovens, hot-plates. J. F. Parker, Hugh Aiken, George D. Roper, M. Green, William Gaffney, C. H. Page, Jr., and Miss Martha Meiklejohn, in charge.

William M. Crane Company, New York. Gas ranges, odorless heaters, gas fittings, inverted lights, cake griddles, toasters, etc. William M. Crane, John M. Brock, C. F. Timm, H. L. Schutt and F. G. Dean, in charge.

M. Kirchberger & Company, New York. Method of manufacture of German lava tips; acetylene tips for automobile lamps. M. Kirchberger, H. Leganger and Herman Blancke, in charge.

American Ironing Machine Co., Chicago. Ironing machines. G. A. Renner, Mr. Baruch and Mr. Gross, in charge.

Auto-Igniter Company, New York. Gas mantles. W. F. Holcombe, W. W. Barnes, in charge.

Pittsburg Meter Company, Pittsburg. Gas and water meters, heaters. J. H. Davis, in charge.

Sanitary Heating Company, New York. Gas heaters. William H. Schofield, in charge.

Toledo Stove and Range Company, Toledo, O. Gas ranges. H. A. Furber, in charge.

Peerless Heater Company, Chicago. Combination kitchen boiler and water heaters. A. Bodenweiser, B. F. Parkhill, John Frakes, E. J. Puffer, M. Gray, in charge.

Ruud Manufacturing Company, Pittsburg. Automatic water heaters. James Hay (president), A. P. Brill (general manager), F. W. Pripps, C. E. Bartlett, in charge.

Springfield Gas Appliance Company, Springfield, Mass. Automatic water heaters. S. Bernstein, T. W. Pitcher, in charge.

William Kane Manufacturing Company, Philadelphia. Water heaters, automatic steam boilers, radiators. William Kane, Lewis Yetter, in charge.

Gas Tip and Self Lighter Company, New York. Gas tips and burners. George H. Gregory, in charge.

Detroit Stove Works, Detroit, Mich. Gas stoves, ranges, heaters, water heaters, appliances. E. G. Van Wie, H. D. Schall, G. W. Johnson, in charge.

Sargent Steam Meter Co., Chicago. Gas calorimeters, anglemeters, draught gauges, steam heaters, dust determinators, aspirators, etc. R. B. Peebles, C. E. Beck, Miss E. Erwood, in charge.

Maryland Meter Company, Baltimore, Md. Gas meters. C. F. Asendorf, A. H. Barrett, E. S. Dickey, in charge.

Emer & Amend, New York. Chemists' supplies. P. E. Haynes, C. G. Dreffein, in charge.

American Meter Company, Philadelphia. Meters, meter-provers, photometers, gauges, etc. J. M. Morehead, P. E. Haynes, C. G. Dreffein, in charge.

James Manufacturing Company, Cleveland, O. Gas tubing. E. James, Arthur Huston, Miss Flo Sibbett, in charge.

General Gas Light Company, Kalamazoo, Mich. Gas lamps and mantles. A. H. Humphrey, J. J. Knight, Walter Blincks, J. P. Conroy, C. T. Chism, Harry F. Hicks, F. J. Humphrey, Charles Luther, W. F. Weadley, in charge.

People's Gas, Light and Coke Company, Chicago. Advertising material. R. A. Rosen, in charge.

James B. Clow & Sons, Chicago. Gas radiators and heaters, gas and heat construction. O. W. Bruner, N. E. Frost, G. F. Bullard, in charge.

Peerless Light Company, Chicago. Lamps and mantles, self lighting mantles. Max Herskovitz, Abraham Herskovitz, in charge.

Central Manufacturing Company, Binghamton, N. Y. Gas-heated sad-irons for domestic, laundry and tailoring purposes. J. E. Austin, Mrs. Oliver R. Humphrey, in charge.

Improved Appliance Company, Denver. Gas appliances. S. Tully Willson, in charge.

New Method Company, Mansfield, O. Gas ranges and heaters. H. H. Sanford, B. A. Baxter, in charge.

Connelly Iron Sponge and Governor Company, New York. Automatic governors, telemetric pressure gauges, recording gauges, tar burners, smoke-ammonia-and-gas helmets, iron sponge (purifying material), accident cabinets. S. F. Haywood, S. F. Smyly, in charge.

Chicago Flexible Shaft Company, Chicago. Gas furnaces for working with metals. F. B. King, Theodore Johnson, in charge.

Sprague Meter Company, Bridgeport, Conn. Cast iron gas meters. H. H. Sprague, W. P. Hutchinson, in charge.

Brand Stove Company, Milwaukee. Domestic and hotel ranges, gas appliances. R. S. Robinson, G. Riffles, M. J. Franey and F. V. Fitzsimmons, in charge.

Ringen Stove Company, St. Louis. Gas ranges and water heaters, candy stoves. W. A. Lockwood, J. R. Brower, in charge.

Anchor Stove and Range Company, Louisville, Ky. Gas stoves and appliances. George W. Graves, Walter Tersgge, in charge.

Crandall & Godley Company, New York. Portable reel gas oven for bakers' use. Paul J. De Lancy, in charge.

Stamford Gas Stove Company, Stamford, Conn. Gas ranges and heaters, factory and nursery burners, oyster cookers. Henry J. Warren, in charge.

Rathbone, Sard & Company, Albany, N. Y. Gas ranges and heaters. Datus F. Brown, Russell E. Sard,

John Garrison, G. O. Ciliax and Thomas Kendall, in charge.

Aurora Illuminating and Mantle Company, Aurora, Ill. Inverted arc lamps and mantles. C. E. Erickson, J. Wysocki and F. A. Lankow, in charge.

Economy Stove and Range Company, Cleveland, O. Elevated-oven gas ranges, copper coil and cast iron disc water heaters. A. L. Gassett, C. H. Seymour, M. C. Boher, F. A. Nieberding, in charge.

Welsbach Company, Philadelphia. Mantles and inverted lights. J. Earl King, C. W. Waddell, Sidney Mason, Townsend Stites, Fred G. Corbus, B. J. Kellum, Alan Leamy, E. S. Chapin, T. H. Piser, Alphonso Mason, Robert J. Thompson, A. T. Knowlsen, T. M. Ambler, Thomas J. Little, F. G. Johnson, Alexander McNabb, R. J. Ralston, S. Eibenschutz, J. P. S. Osterhoudt, E. J. Seeley, J. Goldman, C. C. Dunkle, B. F. Perkins, W. H. McCormick, A. I. Wallace, W. T. Beardmore, Harry Daines, John Jennings, F. W. Dougherty, C. B. Tibbetts, E. Joseph, C. L. Hudson and M. E. Smith, in charge.

Kalamazoo Stove Company, Kalamazoo, Mich. Gas stoves and ranges. William Thompson, A. H. Dane, J. C. Goodale, Jr., O. L. Taylor, in charge.

Lindsay Light Company, Chicago. Lights and mantles. J. A. Simmons, Art. Revell, H. S. Towne, Harry Christiansen, Alex Sinai, George P. Gilman, Jr., C. R. Gillette, Herbert Osborne and Harry McAvoy, in charge.

M. A. Phelps, Chicago. Gas roasters. Miss M. A. Phelps, J. T. Beasley, J. C. McCraig, B. D. Harrison, in charge.

Kohler Die and Specialty Company, Chicago. Gas jet heater. Victor Kost, Mrs. Victor Kost, H. A. Kohler, in charge.

Economy Gas Heater Company, St. Louis. System for burning by-products of gas. E. G. Van Zandt, J. S. Wilkinson, Mrs. Emma Roberts.

George M. Clark & Company, Chicago. Gas ranges, heaters, coke burners. R. K. Clark, A. F. Milliken, John Bockley, C. T. Mason, E. B. Martin, T. M. Gilfilan, Charles Macbeth, George H. Proetz, B. N. Williams, in charge.

Schaeffer & Budenberg Manufacturing Company, Chicago. Thermometers used in gas manufacture, low pressure gas gauges, recording pressure gauges, gas engine indicators, etc. Willard Henry Shanton, Jacob Nienhuis, in charge.

Block Light Company, Brooklyn, N. Y. Indestructible mantles. J. Fraenkel, Otto Kaufmann, Joseph Phillips, in charge.

Schneider & Trenkamp Company, Cleveland, O. Gas ranges, water heaters, heating stoves. H. C. Fritz, J. Shirathin, W. G. Bowman, R. Merke, W. A. Framke, J. R. Cunningham, N. Wilson, A. V. Ellis, Henry Trenkamp, Sr., H. J. Trenkamp, Jr., Barney Guerink, Louis Guerink, in charge.

Michigan Stove Company, Detroit. Gas ranges, water heaters. L. B. Young, E. C. Lovrett, C. J. Breen, R. B. South, in charge.

Estate Stove Company, Hamilton, O. Ranges, water heaters, special appliances. H. W. Hunter, C. E. Draper, E. Harr, B. F. Kahn, C. C. Williams, Samuel Kahn, L. Kahn, George Arndt, in charge.

A. J. Lindemann & Hoverson Company, Milwaukee. Ranges and heaters. George W. Rue, M. H. May, in charge.

Connersville Blower Company, Connersville, Ind. Blowers, melting furnaces, motors. C. R. Houghton, in charge.

Ames Boiler Company, Chicago. High pressure boilers. D. H. Stevens, Mr. Beeman, in charge.

American Metal Hose Company, New York. Metallic hose and tubing. A. Rubin, in charge.

Edward Katzinger Company, Chicago. Gas furnaces for confectioners and bakers. Edward Katzinger, in charge.

JNO. C. D. CLARK.
Chairman of the Gas Appliance Exposition held this week in Chicago.

American Gas Light Company, Kalamazoo. Inverted arc light. A. C. Zissler, J. Wheeler, H. F. Clark, in charge.

Albany Foundry Company, Albany. Gas ranges and heaters. James F. Magee, Charles A. Holmes, in charge.

Dawson Brothers, Chicago. Gas grates, gas-logs, mantels, mosaic tile work. H. W. Dawson, in charge.

National Stove Company, Div., Lorain, O. (American Stove Company.) Gas ranges and heaters. F. K. Berry, J. A. Alexander, T. J. Moran, in charge.

Standard Lighting Company, Div., Cleveland, O. (American Stove Company.) Gas ranges and heaters. W. G. Voigt, J. C. Shirra, A. P. Sweatman, in charge.

New York Improved Meter Company, New York. Gas meters.

A. E. Detwiler, Chicago. Repairs. A. E. Detwiler, in charge.

Thos. P. Watts, of Thos. P. Watts & Sons, manufacturers of appliances for natural gas, of Kansas City, Mo., was in Chicago this week and attended the Gas Appliance Exposition.

Metal Market

New York Metal Market, December 8.

Copper, Prime Lake	$14.50
Copper, Lake, Arsenical brands	14.50
Copper, Electrolytic	14.25
Antimony, Cookson's	8.12½
Lead	4.25
Straits Tin	28.85
Spelter	5.15

Chicago Iron Market, December 10.

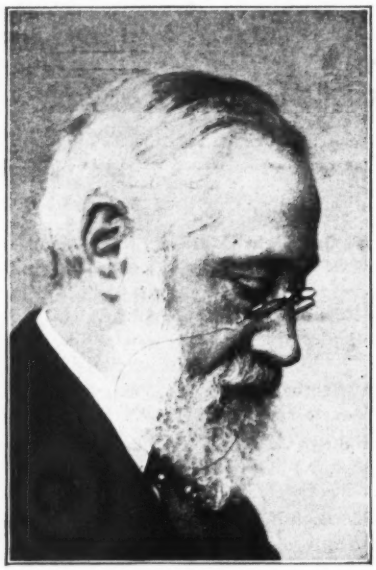
Southern, No. 2 Foundry	$17.35-17.85
Lake Superior Charçoal	19.50-20.00
Lake Superior Coke Iron, No. 2 Foundry	17.00-17.50

December 10, 1908:

Foundry iron was the same price as the week previous
$5 less per ton than the year previous
Copper was ½c more a lb. than the month previous
¼c more a lb. than the year previous

Cleveland, O.—The principal activity in the pig iron market has been confined to buying by cast iron pipe interests, about 25,000 tons having been taken by the leading interests, says The Iron Trade Review. Blast furnace production during November was at the rate of 52,744 tons daily, compared with 50,764 tons in October.

Who's Who in Britain—IX



Sir Philip Magnus, born in London in 1842, was educated at University College, London, and the University of Berlin. He is a member of the Senate and a Fellow of London University, and has contributed greatly to the promotion of technical education in Britain. He was Organizing Director and Secretary of the City and Guilds of London Institute in 1880-1888, and is now Superintendent and Secretary of its Department of Technology, which has done so much for the education of plumbers. He was knighted in 1886, and has represented London University in Parliament since 1906.

Personal

Jas. A. Campbell, president of the Trenton Potteries Company, of Trenton, N. J., visited Chicago this week.

J. F. Dean has succeeded Thos. J. Lee, Jr., as buyer for the Newark Supply Company, of Newark, N. J., Mr. Lee having withdrawn from that company.

It is reported from Kansas City that Murray Kirkwood, with the H. Mueller Manufacturing Company, has been elected president of the Millionaires' Club.

Geo. T. Coppins, secretary of the Walworth Manufacturing Company, of Boston, was in Chicago this week and called on some of his many friends in the trade.

R. Dee Pierce, secretary of M. Glauber & Company, of New York City, was in Chattanooga, Tenn., this week on the return trip of his three months' tour of the western and southern states.

Martin Wys, of the Sanitary Manufacturing Company, of Hamilton, O., has just reached Denver after an extended trip through the southern states. He reports business good and the outlook most encouraging.

George Peck, Jr., of the George W. Peck Hardware Company, of Bath and Canandaigua, N. Y., was recently married to Miss Ida Nash, of Bath. Mr. Peck is at present in charge of the business at Canandaigua, which includes plumbing and hardware.

Harry Durland, of the plumbing firm of L. H. Durland & Son Company, at Watkins, N. Y., is receiving congratulations from a host of friends upon the announcement of his engagement to Miss Florence S. Barnes, a charming young lady of the above place.

S. A. Blake, of Marshalltown, Iowa, has been appointed to represent M. Glauber & Company, of New York City, in Kansas and Nebraska. Mr. Blake has a wide acquaintance in the trade, as he was formerly connected with the Omaha branch of the Crane Company.

W. J. Lang, of Chicago, president of the Illinois State Association of Master Plumbers, has the sympathy of his large circle of friends, both in and outside of the trade, on account of the demise of his sister, Miss Emma B. Lang, which occurred on Friday, December 4.

Lee B. Mettler, Kansas City representative of the Pittsburg Water Heater Company, has been elected president of the Ararat Temple of that city. A new temple is being constructed, in which Mr. Mettler is taking a personal interest, particularly as far as plumbing and heating and lighting equipment are concerned, and he would like to receive suggestions along these lines.

Obituary

William H. Gaughan, senior member of the plumbing firm of Gaughan & Cuff, on Broad street, Providence, R. I., passed on at his home in that city on Saturday, November 28, in his thirty-ninth year. He was one of the victims of the typhoid epidemic and was the first to succumb to the disease. He had been sick for two weeks, and up to within a few hours before his death was believed to be on the road to

recovery. Mr. Gaughan was born in Lawrence, Mass., but had lived the greater part of his life in Providence. When a young man he learned the plumbing trade and followed it for a number of years as a journeyman, afterwards becoming a master plumber. He had a wide acquaintance among men in all walks of life and was well liked by all who came in contact with him. His business was flourishing and the firm has always been looked upon as one of the leading concerns in the trade in that city. Mr. Gaughan leaves a widow and two children.

Association News

Cleveland, O.—The Cleveland Master Plumbers' Association, at a meeting recently held, passed resolutions in memory of the late Evan M. Jones, a valued member of the organization, whose death occurred last month.

Boston, Mass.—The annual meeting and election of officers of the Master Plumbers' Association of Boston and vicinity will be held on Thursday evening, December 24. The officers will be installed on the following meeting night, which falls on January 14, 1909.

Philadelphia, Pa.—The North East Master Plumbers' Association held its annual banquet and entertainment at Liberty Council hall on Germantown avenue on Friday evening, December 4. A large number of members and visiting friends from the main association, and also the various district associations, were in attendance. Several addresses were made and the entertainment and banquet were enjoyed.

Denver, Colo.—The Denver Master Plumbers' Association gave a smoker after its regular meeting on the night of November 30 and the sixty members present enjoyed with satisfaction the good things provided by the entertainment committee, which consisted of William H. Hensler, Peter E. Snow and Fred Suess. In all probability a card party and dance will be given some time in the early part of the new year.

Philadelphia, Pa.—The Master Plumbers' Association of this city at its December meeting nominated the officers and directors for the ensuing year. The election will take place in January. A committee was also appointed to arrange for the annual meeting and banquet, which promises to be an interesting event. The beneficial fund of the members is increasing, and as the men begin to realize its advantage many applications for enrollment are received. Quite a number have already taken advantage of the feature.

Chicago, Ill.—All the arrangements have now been completed for the fifth annual reception and ball which will be given by the North and West Side Master Plumbers' Pleasure Club on Wednesday evening, December 16, at the Northwest hall, 690-692 West North avenue, near North Western avenue. The committee of arrangements, consisting of E. J. Benning, chairman; C. C. Breyer, E. C. Wagner, Joseph Scheuer and A. W. Bahn, with the assistance of Col. Fred J. Wagner, the club's business manager, has spared no effort to make this event the most pleasant of the kind ever given by the club, and as these events all have been thoroughly enjoyable affairs it is a high goal the members of the committee have set themselves. An excellent orchestra has been secured for the evening, and the attractive hall will be most tastefully and artistically decorated with palms for the occasion.

Who's Who in America—V

Eb Ellen, one of the best known master plumbers in the State of Ohio, was born in Devizes, Wilts, England, on December 8, 1855, and received his education in the Common English school in that city. He started to learn the plumbing trade at the age of thirteen in his native city, remaining there until he was seventeen, when he emigrated to America and came at once to Cleveland, O., where he finished his apprenticeship with Geo. S. Paine, after which he worked as journeyman plumber in Painesville, O.; St. Paul, Minn.; Portland, Ore.; San Francisco and New York City. In 1885 he returned to Cleveland, O., and started in business on his own account at 4714 Central avenue, where he is still located. In 1898 he admitted Walter C. Norris into partnership, and the business has since then been conducted under the name of Ellen & Norris. Mr. Ellen has been a member of the Cleveland Master Plumbers' Association for the past twenty-two years, and he served the organization as secretary one decade from 1896 to 1906, and was again elected to that office on January 1, 1908. In the Ohio State Association of Master Plumbers he has made a fine record by rendering invaluable services in the following capacities: Secretary-treasurer in 1899; vice-president, 1901; president, 1902; secretary-treasurer for a term of five years from 1903, and re-elected Feb. 12, 1908, for another term of five years. Mr. Ellen is a member of the Cleveland Builders' Exchange, and he belongs to the following fraternities: Woodward Lodge 508, F. & A. M.; McKinley Chapter, No. 181, R. A. M., and the Cleveland Council, Royal League.

Albany, N. Y.—The Master Plumbers' Association of this city, at a meeting held last week, elected the following officers for the ensuing year: President, Thomas F. Nolan; vice-president, Thomas A. O'Malley; recording secretary, James H. Doody; financial secretary, Frank F. Schimpf; treasurer, John E. Dugan; sergeant-at-arms, John C. McNally; trustees, John L. Fitzgerald, Thomas F. Peirce and Jeremiah Kieley. The new officers will be installed on Tuesday evening, December 15, and this ceremony will be followed by a banquet in honor of the retiring officers.

Wausau, Wis.—President Jacob Schuh and Secretary George F. Reeke, of the Wisconsin State Association of Master Plumbers, were recently entertained by the master plumbers of this city in the Hett & Molter hall on Scott street. The main features of the program were speeches by Messrs. Schuh and Reeke, who both dwelt on the necessity of organization in such an effective manner that the local association at once was reorganized with the following list of members: Danielson Bros., Hett & Molter, A. B. Wheeler & Son, A. H. Halder and E. L. Pine. The following officers were elected for the coming year: President, D. Danielson; vice-president, B. J. Hett; secretary, A. B. Wheeler, and treasurer, A. H. Halder. Refreshments were served and cigars passed around, after which Mr. Danielsen contributed his share to the gaiety of the occasion by a "Song and Dance," while Messrs. Halder and Pine told several good stories, making it all in all an exceedingly enjoyable event.

New York News

Corning, N. Y.—Magee & Metcalf have secured contracts for the plumbing in four residences for Mrs. Burgey.

Bath, N. Y.—J. Lyon Robie is engaged with the plumbing and heating work in the new Shannon block on Main street.

Silver Creek, N. Y.—D. L. Webb has things about all his own way in the plumbing, heating and gas fitting lines. Just at present he has contracts for such work in ten new houses to keep him busy.

Syracuse, N. Y.—The Board of Contract and Supply, of this city, has let the contract for plumbing the new Police and Educational buildings to Edward Joy. The buildings were formerly used as a court house and county clerk's office, and when the new court house was completed the city bought the buildings, and they will be used by the police department and board of education.

Syracuse, N. Y.—B. Joseph O'Donnell, of the Master Plumbers' Association of this city, expressed great satisfaction this week over the fact that the agitation for the establishment of a **Public Comfort Station** has been taken up by the Chamber of Commerce of this city. The local Master Plumbers' Association is pledged to its support, and will push it along wherever it is possible. **Another good thing has happened in town, in the approval and adoption of a plumbing code** by the commissioner of public safety, which makes it a law in the cities of this state. The master plumbers in this city have been working on this matter for the past four years. **E. De Forest Winslow.**

Plumbing Legislation

Cleveland, O.—The plumbing ordinance which was prepared for this city about two years ago will probably be passed in the near future and put in operation January 1, 1909, after it has been revised to some extent.

Oklahoma City, Okla.—Two plumbing ordinances are at present before the city council. One was prepared by the master plumbers and endorsed by local architects and physicians, and the other was presented by the plumbing inspector. The ordinance committee plans to make a compromise ordinance.

Bowling

The bowling league of the Walworth Manufacturing Co., of Boston, Mass., is now well under way, and much interest is being shown in the various teams, among whom keen rivalry exists. Last week closed with the Stillson Wrench team still in the lead, as they have been for some time past, but with the Tool room team a close second. Lower down in the list, however, several changes are recorded, the Order department team having passed the Brass machine department, while the Brass Polishers' team has risen from last place to fifth. There are five teams in the league, and at the opening of the present week they stood in the following order: Stillson Wrench, Tool room, Order department, Brass Machine, Brass Polishers, Cost department, Draftsmen, Iron Valve. The high men were Bates, with an average of 97; Plummer, 92; Comerford, 89; O'Brien, 88, and Martin, 88. In the games of last week the results were as follows: On Tuesday, December 1, the Tool room won two out of three from Cost department, and Brass Polishing won three straight from Draftsmen. On Friday, December 4, the Order department took three straight from Iron Valve, and Stillson Wrench won three from the Brass Machine team. Games are rolled on Tuesdays and Fridays of each week at the Washington alleys.

Trade Literature

From H. Mueller Mfg. Co., Decatur, Ill.: "It's in the Wings," a handsome de luxe booklet, containing the story of a modern invention. The "motif" of the story is this: Norman McLeod was the general foreman of the railroad shops in an Illinois town. The company ordered him to reduce the cost of repairs on locomotive check valves. The valves they were using clogged with dirt, which interfered with their opening and closing, and the seats required frequent regrinding. So he set to work to make a valve that would be non-fouling, that would not hang or stick and that would be self-grinding. The little book tells how successfully he carried out orders, and the result—the McLeod-Mueller non-fouling turbine check valve.

TOO LATE TO CLASSIFY.

WANTED—A1 SALESMAN, FAMILAR WITH HEATING and plumbing supplies. State experience and references. For territory adjacent to Chicago. Address No. 997, "Domestic Engineering," Chicago.

Heating Unity.

The efficiency, as heating units, of IDEAL Boilers is well matched by the utility and working capacity of AMERICAN Radiators as heat distributors. Each is dependent upon the other for the full measure of heating value to the houseowner.

Heating Unity finds its best expression in the cozy comfort of a well heated home.

IDEAL Boilers and AMERICAN Radiators are both subjected to the same severe tests for efficiency. As the principle parts of a heating outfit IDEAL Boilers and AMERICAN Radiators are joined together by the common aim of constant and superior heating results, an aim which is best fulfilled when both factors are working together.

AMERICAN RADIATORS & IDEAL BOILERS

AMERICAN RADIATOR COMPANY

General Offices, 282-286 Michigan Ave., Chicago.

New York	Cincinnati	Cleveland	Atlanta	Brantford, Ont.	Denver
Philadelphia	Boston	Milwaukee	Minneapolis	Seattle	St. Louis
Pittsburg	Buffalo	Indianapolis	Kansas City	Omaha	San Francisco

Pacific Coast

San Francisco, Cal.—Edward Friedlander has sold his plumbing shop to the Morris Stulsaft Company.

San Francisco, Cal.—Sewer construction work is occupying the attention of the board of public works and plans are being drawn for many additions to the present system. The installation of storm sewers provided for in the new plumbing law recently passed will materially relieve the present congestion of the main sewers in the winter time.

Yosemite Valley, Cal.—A complete steam heating plant has just been installed in the Sentinel hotel here, the great pleasure resort of California. This was made necessary by the throwing open of the valley to winter travel. The completion of the Yosemite Valley Railroad, which, in conjunction with the Southern Pacific, brings the valley within easy and comfortable reach of all, will also in the near future necessitate the enlargement of the hotel or the building of another structure to care for tourists. At the entrance of the valley the Del Portal hotel, which has recently been completed, is also equipped with modern steam heating, sanitary plumbing and modern devices not hitherto to be found in the hostelries of the valley.

San Francisco, Cal.—Perhaps the best indications of industrial activities in San Francisco that can be given are to be found in the reports of the different labor unions concerning the employment of their members. The Steam Fitters' Union reports that every member is employed at the present time, the best record shown in the past year. The Plumbers' Union is not so fortunate and there are several members now out of work, but this number has been materially decreased during the past two months and conditions now may be regarded as practically normal. Most of those now out of employment are newcomers or those who picked up the trade in the days following the fire, when anyone who was handy with tools could find work.

San Francisco, Cal.—Work on the auxiliary salt water system for fire protection is now going on at a rapid pace, and construction work on the immense cisterns has commenced at various points. An appeal has been made on behalf of the local bidders to have the contracts for the salt water pumping plants awarded to a San Francisco firm. It appears that many of the eastern bids exceeded the tender of the local concerns, but that the lowest bidder was an eastern concern, which offered to do the work for $7,000 less than the local concern. It is pointed out on behalf of the San Francisco firms that $7,000 is but five per cent of the total cost of the contract. It is stated further that it will be necessary for the city to expend large sums to send its representatives east to inspect the machinery of the lowest bidder and to make the necessary tests. Special stress is placed upon the policy of encouraging home manufacturing. It is further argued that it is the part of wisdom to keep the city's money in San Francisco to assist in the work of reconstruction.

Labor Field

Boston, Mass.—Edwin O. Cox, of the plumbing firm of Pierce & Cox, has been denied his petition for an injunction against several labor unions, the members and representatives of which he sought to have restrained from interfering with the carrying out of a contract with the Boston City Club. The club was also named as a defendant and the court was asked to restrain it from breaking the contract. Judge Richardson heard the case in the equity session of the superior court and declined to grant the injunction when it transpired that the Boston City Club had paid Cox in full for the work called for under his first contract. Under these conditions the justice ruled the club was at perfect liberty to exclude Cox from finishing the plumbing in their new quarters, which he had contracted for. The case will be heard later on its merits.

Contemplated Work

Washington, D. C.—Sealed proposals will be received at the office of the Supervising Architect until 3 o'clock P. M., January 9, 1909, for the construction (complete) of the U. S. Post Office at Murfreesboro, Tenn., in accordance with the drawings and specifications.

Washington, D. C.—Sealed proposals will be received at the office of the Supervising Architect until 3 o'clock P. M., January 7, 1909, for the construction complete of the U. S. Post Office at Johnson City, Tenn., in accordance with the drawings and specifications.

Washington, D. C.—Sealed proposals will be received at the office of the supervising architect until 3 o'clock p. m., January 5, 1909, for the construction (including plumbing, gas piping, heating apparatus, electric conduits and wiring) of the United States postoffice at Niles, Mich., in accordance with drawings and specification.

Washington, D. C.—Sealed proposals will be received at the office of the Supervising Architect until 3 o'clock p. m., January 11, 1909, and then opened, for the construction (including plumbing, gas piping, heating apparatus, electric conduits and wiring) of the U. S. postoffice at Gainesville, Fla., in accordance with drawings and specifications.

Washington, D. C.—Sealed proposals will be received at the office of the supervising architect until 3 o'clock p. m. on the 6th day of January, 1909, and then opened, for the construction (including plumbing, gas piping, heating apparatus, electric conduits and wiring) of the United States postoffice at Paris, Ill., in accordance with drawings and specifications.

An Encouraging Average.

"I have been looking over my financial operations," said Mr. Easigo. "I must say they are more successful than usual."

"Have you been making large profits?"

"No; I don't expect anything like that."

"But you say you were successful?"

"Comparatively successful. During the month I have loaned money to five friends and only three of them have quit speaking to me."—Washington Star.

The Need of Standards

Concluded from page 295

ton was used, but in the last few years the net ton has been chosen. There has been an exception to this practice even, as in 1900 **there was a return to the gross ton.** A still more peculiar situation is developed in the operations of the geological survey of the United States which **uses both the net as well as the gross ton,** the net ton being used for references to bituminous coal, and the gross ton when anthracite coal is referred to. Railroad statistics are also published **in the same bewildering method.** Thirty-six years ago the **net ton** was adopted by the American Iron and Steel Association in the collection of its statistics. About twenty years ago the **gross ton** was adopted and since then all of the statistical tables published by the Association have been revised and figures converted into gross tons. This has been done from the beginning of its work, so important is the Association's belief that uniformity in statistical work was necessary. Would it not be a good idea for the statisticians to form an association themselves which would **set up the standards and thereby secure more comparable results?.**

On His Legs.

"I see Follensby is on his legs again."

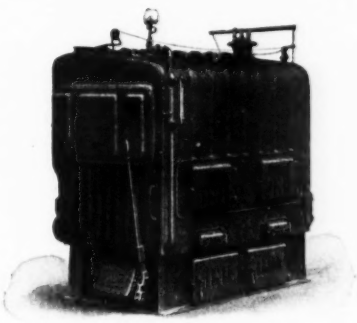
"No, he isn't. He hasn't a half-penny. Had to sell his horse and carriage."

"That's what I mean. Now he walks."—Brooklyn Citizen.

With the Makers

The Shirley Side-Feed Boiler.

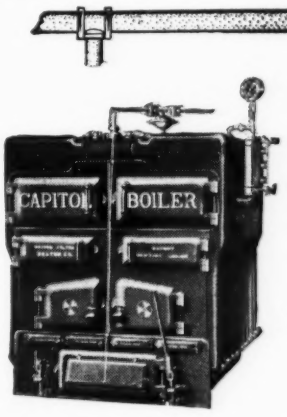
The Shirley Radiator & Foundry Company, of Indianapolis, Ind., has just placed a new side-feed boiler on the market which, according to the maker's claims, is constructed in such a way that it makes it possible to take better care of the fire and to fire more economically. This new boiler has a large fire chamber



The new Shirley side feed boiler.

and grate surface, and the largest possible fire travel. It is well equipped with clean-out doors, making it possible to keep the flues clean, and it has an improved grate which is operated at either end. The smoke box can be put at either end, and the smoke pipe has the

CAPITOL BOILERS AND RADIATORS



Better be Safe than Sorry

Capitol Boilers and **Radiators** are sold exclusively through the trade. **Capitol Boilers** do not disappoint in results—they give full heating efficiency with fuel economy, are easy to install and so simple in operation that a woman or child can "keep 'em going". **Capitol Radiators** are very artistic in appearance and have the maximum of prime radiating surface. Why not send for Catalog and terms? You want the best for your customers. "It is better to be safe than sorry."

United States Heater Company.

General Offices and Works: Fort St. and Campbell Ave., DETROIT, MICH.

Branches:

DETROIT	139 Jefferson Ave.
NEW YORK	129 Worth St.
CHICAGO	84 Dearborn St.
KANSAS CITY	120 W. 11th St.
OMAHA	916 Farnam St.

Sales Agencies:

ST. LOUIS, MO., L. M. Rumsey Manufacturing Co.
DENVER, COLO., Kellogg & Stokes Stove Co.
MINNEAPOLIS, MINN., Plumbing & S. F. Supplies Co.
NORFOLK & RICHMOND, VA., Virginia-Carolina Supply Co.

universal joint, permitting it to enter the chimney at any angle. It has thin waterways, with the largest amount of direct heating surface possible, thus making it a quick-circulating boiler. The manufacturer will be glad to send interested parties complete information upon request, mentioning "Domestic Engineering."

Craig Boilers and Koran Radiators.

The Williamsport Radiator Company, of Williamsport, Pa., has recently issued a neat catalogue illustrating and describing its products, the Craig steam boilers and hot water heaters and the Koran radiators for steam and water. From this interesting catalogue the following information about these boilers and radiators has been obtained: The Craig boiler is a sectional water tube boiler, made of the very best gray cast iron, under the supervision of experts in their line. Its construction gives a positive vertical and semi-horizontal circulation with least possible friction. Its screw nipple construction allows the removal

Sectional view of the Craig sectional steam boiler.

of any section at will; its grate is easily operated, very durable and all bars are interchangeable; its flue surface is easily cleaned through large clean-out doors; its ash pit is large and deep, allowing ample space for air for combustion. All the Craig boilers are tested to 80 pounds at the factory before shipping, and they have the proper amount of direct fire surface, together with well proportioned flue surface. The Koran radiators are made of the very best soft gray iron with slip nipple connections, in either plain or ornamental pattern, and they are finished in a very smooth and perfect manner. The manufacturers will be glad to send particulars to interested parties upon request mentioning "Domestic Engineering."

The Walworth Manufacturing Co., of Boston, has enjoyed such a boom during the past month that it has been found necessary to take on thirty new hands at the South Boston works. More help, it is anticipated, will be hired before the close of the present month in order that there may be no falling behind in orders.

Pearce & McCall, of 140 West 42d street, New York, announce that they have been appointed selling agents for New York and vicinity for the Rickersberg Brass Company, Cleveland, O.; Rolf -Martin Company, Ft. Wayne, Ind.; American Bolt & Screw Case Company, Dayton, O.; the S. & I. Company, Springfield, Mass., and the Edgecombe Company, of Cuyahoga Falls, Ohio.

The Galard Company, of 31 Union Square, New York, N. Y., which entered the eastern market about July 1st of this year, with a line of white enameled closet seats and tanks, both stool, medicine cabinets, etc., has erected a factory in Newark, N. J., having 20,000 square feet of floor space, and will soon begin the manufacture of a large line of plumbing specialties. As yet it has placed upon the market only its Omala line of white finished wood work, which is treated by a secret process, giving it a hard, glossy and non-absorbent surface. The company expects to have its large plant in full operation very soon after January 1, 1909, when the production of its other specialties will be begun upon a liberal scale, and a strong selling force put aggressively to work among the trade.

Patents

904,163. Indicator for Radiators. Harry Vissering, Chicago, Ill.

904,215. Hot-water Heating Plant for Buildings. Casimir Obrebowicz, Warsaw, Russia.

904,286. Trap for Waste-pipes. Otto Waibel, Singen, Germany.

904,307. Plug-valve. John H. Chandler, Indian Orchard, Mass.

904,324. Sewage-distributer. John W. Hartley, Stoke-upon-Trent, England.

904,329. Faucet. George R. Hohman, Rochester, N. Y.

904,397. Chain Pipe-wrench. George Amborn, New York, N. Y., assignor to J. H. Williams & Co., Brooklyn, N. Y., a corporation of New York.

904,499. Steam Heating System. Charles T. Ammon, Wooster, Ohio, assignor of one-half to Samuel Kready, Wooster, Ohio.

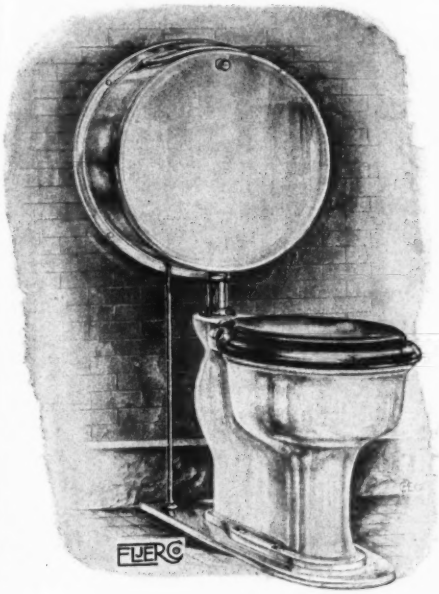
905,139. Automatic Draft-Regulator for Hot Water Heating Systems. Erick Berge, Minneapolis, Minn.

905,181. Compression-Cock. Edward G. Hedges, Newark, N. J.

905,341. Pressure-Filter. Charles W. Merrill, Lead, S. D.

905,378. Fire and Temperature Alarm or Indicator. George L. Smith, Aberdeen, Scotland.

905,443. Boiler-Alarm. William Loudon, Seattle, Wash.



PATENTS NOW PENDING
Both mechanical and design

ELJER CHINA TANKS

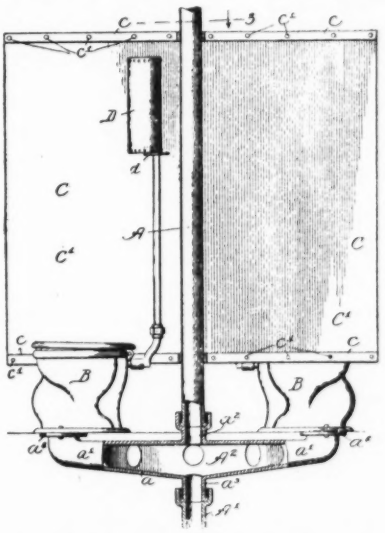
Are circular in shape, are made that shape to prevent all chance of WARPAGE, CROOKEDNESS OR ILL-FITTING COVERS. Has no metal linings or wood joints. They are the best material throughout. To end all tank troubles try the circular Eljer. Every tank guaranteed.

MANUFACTURED BY

ELJERCO

CAMERON, WEST VIRGINIA

905,539. Water Closet. James W. Kelly, Chicago, Ill. The most notable claims for this invention are as follows: In closet construction the combination with a soil-pipe, of a plurality of closet-bowls grouped



about said soil-pipe and connected therewith, and a plurality of compartment walls radiating from and supported on said soil-pipe, said soil-pipe extending upwardly above said compartment walls and serving to vent the closets. In closet construction, the combination of a soil-pipe fitting, comprising in integral formation a central hollow body with a sloping lower wall and having a central upper pipe-section, and pipes formed integrally with and radiating from said hollow body and having upturned ends, a soil-pipe in the course of which said fitting is interposed, closet-bowls mounted on said upturned ends of said radiating pipes, compartment walls radiating from said soil-pipe, said soil-pipe extending above said compartment walls and serving to vent said closet-bowls, and tanks supported above and connected with said closet-bowls. The combination with a soil-pipe of a plurality of compartment walls radiating therefrom, and means clampingly securing said compartment walls to said soil-pipe. The combination with a soil-pipe of a series of two-arm irons grouped about said pipe, and slabs interposed between adjacent arms of said irons and secured thereto.

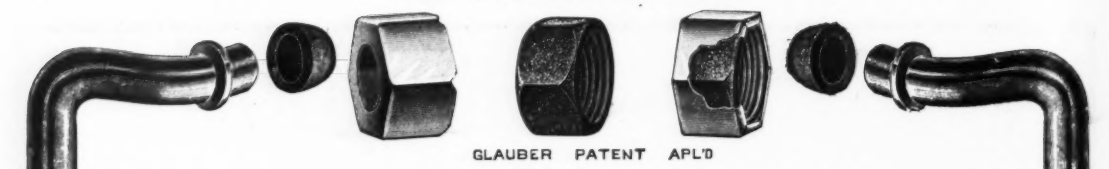
904,477. Water-closet-flushing Apparatus. Conrad Hammer, Buffalo, N. Y.

904,557. Hydraulic Pump. James W. Nelson, New York, N. Y.

904,653. Means for Flushing and Ventilating Closets. Jacob J. Shtuchka, Rochester, N. Y.

905,219. Valve. Olaf E. Oleson, Chicago, Ill.

Burlington, Iowa.—The Russell Sewage Disposal Company, of this city, has installed its sewerless sewage disposal system at Banker B. F. Ketcham's handsome residence in Farmington, Iowa.—Adv.



AGAIN SOMETHING NEW

FINISHED NICKEL PLATED HEXAGON NUT COVER

Conceals Rough Unsightly Nuts—Makes a Neat and Complete Job—Gives a Finished Artistic Effect

Sold separately, and can be used with

GLAUBER ANNEALED SUPPLY PIPES

in connection with Rough nuts usually supplied with bath cocks. Adjustable to various sizes and styles of nuts.

GLAUBER BRASS MFG. CO.

CLEVELAND, OHIO

FREE

We want to acquaint 1,000 Plumbers, Tinners, Hardware and other dealers in the United States with

Doylair Gas Devices

The DOYLAIR odorless Gas Burner requires no regulation. Perfect combustion whether you use three or ten feet of gas per hour.

For Hot Water, Tea or Coffee Urns

Hotels, Restaurants, Barber Shops

Factory, Shop, Store, Home

For Laundry Stoves, Gas Stoves, Gas Heaters

Soldering and Metal Melting

Jewelers, Chemists, Druggists, Laboratory

Patent Pending.
⅛ in. connection.

1,000 Doylair Gas Burners

Useful, wherever a quick, powerful, and clean heat is desired.

Will fuse a copper wire in a few seconds.

Can be attached to any standard connection.

Order one on your business letterhead and we will send this burner to you absolutely free, post-paid. We limit each dealer to one. Will you be one of the 1,000 to respond?

When ordering specify for Artifical or Natural Gas.

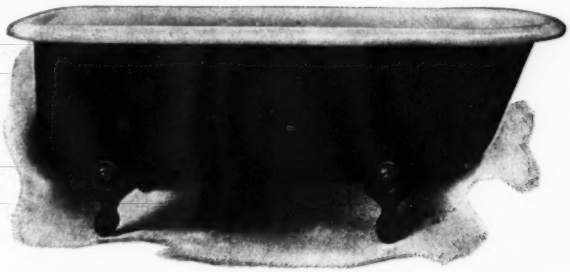
Price, post-paid, 50 cents each.

Northern Syndicate

DEPT. B

213 E. Randolph St., Chicago

A Guaranteed Bath Tub



Patent April 1907

Pressed Steel—Porcelain Enameled

It has been proved and can be demonstrated that enameling on steel is superior to enameling on cast iron.

Light—Strong—Durable—Smooth Exterior

Will readily absorb heat, thus requiring only a small quantity of Hot Water. Manufactured only by

Pressed Steel Sanitary Mfg. Company

Clarence H. Booth, General Manager

Detroit, Mich

The Cyclone Water Closet

=VENTILATOR=

MASTER PLUMBERS:—

You know how well owners of Water Closets would like to have something to prevent or remove the foul or disagreeable odors from Water Closets and the apartments of same.

YOU CAN SUPPLY THE REMEDY

You can make the water closet apartment as sweet as a drawing room and increase your business greatly. The Cyclone Water Closet Ventilator positively cures this vile condition. It can be applied to any water closet and every one you install advertises itself and unsolicited orders come to you, and their sale leads to other Plumbing Work. If you want to greatly increase your business, do not delay taking advantage of our generous free trial offer. Satisfaction absolutely guaranteed. If your jobber does not carry the Cyclone Ventilator, we will be glad to have you send to us for free trial offer, or you may have sample at once by signing the coupon and mailing it to us.

TEAR OFF COUPON HERE AND MAIL TODAY FOR FREE TRIAL

SANITARY APPLIANCE CO., NEENAH, WIS.

GENTLEMEN:—Please send sample of your CYCLONE WATER CLOSET VENTILATOR which we agree to install, according to instructions, on thirty days trial. If the Ventilator proves satisfactory, will push its sale with our trade, and pay for sample ventilator within sixty days' of this order. If it does not prove satisfactory, we are to return it at your expense.

NAME_____ STREET_____

POST OFFICE_____ STATE_____

CLASSIFIED ADVERTISEMENTS

The rate of advertising under this heading is 10 cents a line an insertion, remittance to be made with order. The average advertisement runs five words to a line. To insure insertion in this column copy should be received not later than Wednesday afternoon.

Help Wanted.

WANTED—TO CORRESPOND with a first class plumber who wants a good job. Buchanan-Boughton Co., Marshalltown, Ia.

WANTED—SEVERAL FIRST class salesmen experienced in the sale of plumbers' high grade brass goods. Address No. 995, "Domestic Engineering," Chicago.

WANTED—RADIATOR AND BOILER salesman; applicants state age, experience, salary and territory with which he is familiar. Address No. 981, "Domestic Engineering," Chicago.

WANTED—TWO FIRST-CLASS EXperienced stock men or order pickers, thoroughly acquainted with wholesale plumbing supplies. Address No. 989, "Domestic Engineering," Chicago.

Wanted—First class line of staple steam or plumbing goods to sell to jobbing trade located in territory west and south of the State of Ohio to the coast, on salary and commission basis. Address Sam O. Dugger, 35 Michigan Ave., Chicago.

FOUR SALESMEN WANTED BY Jan 1st., for East and Middle West to sell a line of closet combinations to the retail trade. State experience and references in first letter. Address No. 992, "Domestic Engineering," Chicago, Ill.

WANTED—BOILER SALESMEN TO work in New York, Pennsylvania and New England states territory. Must have experience, a good trade acquaintance, and capable in every way. References required. Address Walker & Pratt Mfg. Co., 31-35 Union St., Boston, Mass.

WANTED—SALESMAN FOR NEW York territory, Albany to Syracuse; also for northeastern Ohio and northwestern Pennsylvania. Applicants must live in the territory and have acquaintance with the boiler and radiator trade. Address Heating Department, The J. L. Mott Iron Works, New York, N. Y.

WANTED — A TRAVELER TO cover the territory of Illinois and portion of Indiana, to represent a very well known large manufacturer of plumbers' supplies. Must be of good habits and have acquaintance with the architects and the retail trade in the territory mentioned. Give your references and salary expected. Address No. 985, "Domestic Engineering," Chicago.

WANTED—ONE OF THE PROgressive jobbers operating in the states of Ohio, Michigan and Indiana and having ample capital for extension of their present business desires to employ three capable salesmen to represent them in plumbing and heating lines. Only live, up-to-date men considered. State full details, where employed at present, salary, sales for past years, age, experience and other facts of interest. All communications strictly confidential. Address No. 986, "Domestic Engineering," Chicago.

Wanted—A man to act as General Sales Manager for a large boiler manufacturer established in the east; one who has had eastern experience; also who is in a position to lay out work, and has some mechanical ideas. State salary, where last employed and give details in full. Address No. 993, "Domestic Engineering," Chicago, Ill.

WANTED—IN THE WEST, A first class man to call on the Architects, Contractors, and the trade generally for wholesale plumbing and steam supplies. Must have good appearance and address. State prior experience and salary expected. Address in own handwriting. No. 994 "Domestic Engineering," Chicago, Ill.

Situations Wanted.

HEATING AND VENTILATING Engineer, technical education and fifteen years' practical experience desires to make a change. Eastern firm preferred. Address No. 996, "Domestic Engineering," Chicago.

A YOUNG MARRIED MAN, FAmiliar with every detail of the plumbing supply business desires to make a change. State position to be filled and salary. Address No. 977, "Domestic Engineering," Chicago.

SITUATION WANTED — EXPERIenced factory and foundry manager is open for engagement. Can handle men to advantage with no friction, and can produce maximum output at minimum cost. Address No. 987, "Domestic Engineering," Chicago.

POSITION WANTED FOR 1909 BY first class salesman; ten years' experience; thoroughly familiar with plumbing and steam goods of every description; splendid acquaintance with jobbing trade through New England and middle west; highest references as to ability, character, etc. Address No. 991, "Domestic Engineering," Chicago, Ill.

For Sale.

FOR SALE.—ONE FOUR HUNDRED horse power Warren Webster feed water heater, safety valve grease controller, complete; used six months; reasonable. Address M. J. Hawkins, Albany, N. Y.

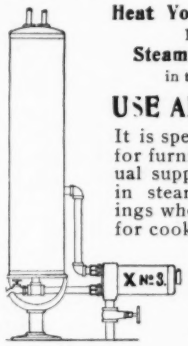
Agencies Wanted.

SALESMAN—EXPERIENCED, DEsires to represent manufacturers of plumbing, steam and gas specialties, salable to jobbers' trade in New York and vicinity. Address Pearce & McCall, 140 W. 42nd St., New York City.

BOOKS.

Fifty Plumbing Charts.—A Layout of fifty Jobs, giving sizes of all piping, Roughing-in Details for all Fixtures, etc. An awfully handy Reference—when in doubt—for the small sum of 25 cents, postpaid, delivered. "Domestic Engineering," Chicago.

Practical Steam and Hot Water Heating.—By A. G. King. This work consists of a series of blue prints, showing in full detail the proper installation of steam and hot water heating plants. It is a practical book for the practical man. No steamfitter's library is complete without it. Price, $5.00, delivered. "Domestic Engineering," 49-53 N. Jefferson St., Chicago, Ill.



Heat Your Range Boiler
From Your
Steam Heating Plant
in the Basement.

USE AN X HEATER

It is specially applicable for furnishing a continual supply of hot water in steam heated buildings where gas is used for cooking.

Write for particulars and prices.

X SPECIALTY COMPANY.
46 Weir St.
Taunton, Mass.

Export Trade

A firm having connections in important trade centers in England and Continent

Manufacturers and Jobbers

are requested to send Price List and Quotations to the

COLUMBUS SHIPPING CO., Ltd.
71 High Holborn, London, W. C., England

Rack Labels

Practical for Plumbers

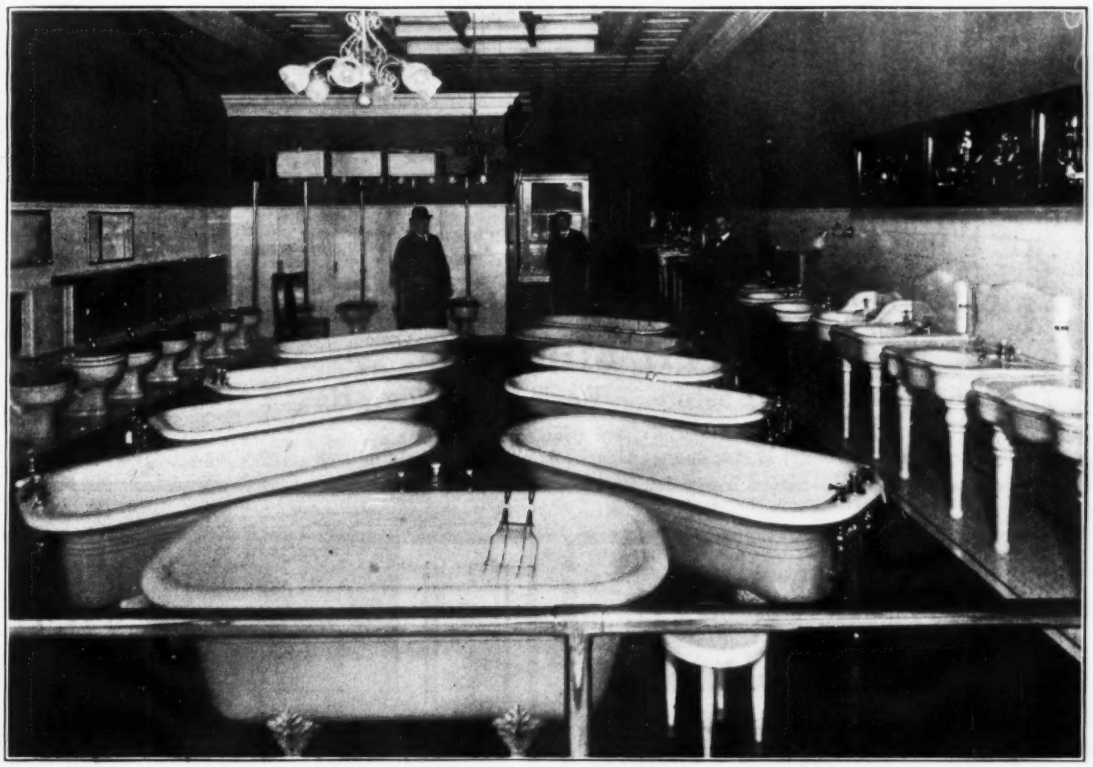
They are mighty good things, ought to be in every shop. Easily applied to shelves, racks or drawers. Shows what you want at a glance, no more guessing or delayed customers. Not only tells the article but illustrates it. Systematizes and facilitates stock taking, gives a neater and smarter appearance to shops. It's a money saver! Printed on water-proof card in plain readable type. Prices low—prices direct or from F. W. Webb Mfg. Co., Elm St., Boston, Mass.

MERCANTILE LABEL CO.
NASHUA, N. H.

Adjustable Radiator Foot Rest

The time saved on each job pays for them—can be used for bath tubs and other fixtures

The Jennison Company, Fitchburg, Mass.
Sold by Jobbers



"A Costly Display." This beautiful display of plumbing fixtures is shown in the well appointed establishment of Davis & Wright, at Buffalo, N. Y. Neither care nor expense have been spared in making this one of the handsomest exhibits of plumbing material in western New York state. Shown in the picture are Jacob Davis, senior member of the firm; Lawrence Hetzelt, cashier, and George Pfeiffer, assistant cashier.

Be sure you are getting a Genuine Stillson Wrench when you pay good money for it.

Look for the

TRADE MARK STILLSON REGISTERED U.S. PATENT OFFICE

If your dealer does not keep the Genuine Wrench write

THE WALWORTH MFG. CO.

128-136 Federal St., Boston Park Row Bldg., New York

European Agents:
Aug. Eggers, Bremen, Germany; H. Munzing, 180 Upper Thames St., London, England; H. Munzing & Co., Paris, France

DAVIS

Patent Graduated Valve for Vapor or Atmospheric HEATING SYSTEMS

Controls the system to an even but ample heat at all times. It responds quickly. On bitter cold days there is ample heat. In mild weather there is just enough for comfort. That means fuel saving. Easily installed. No pressure on radiators.

Every fitter should have our circular. There's money in this device for YOU. No License. No royalty. Write for circular today.

Louis N. Davis Co.

38 East Gay St.

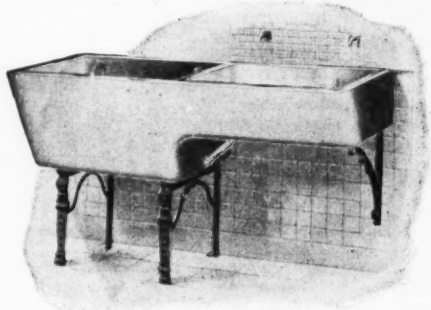
WEST CHESTER, PA.

FOUR

TIMES

The Highest Award for Furlong

Highest Award, Mechanic's Fair, 1893,-'95-'96-'97



Patent applied for

Furlong's Space Saver, Combination Tray and All Goods **Enameled Iron Sink** Guaranteed

Write for Prices or Phone Park 706

THOS. N. FURLONG, Mfr., 360-64 Fell St., San Francisco, Cal.

THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXVI.